V.

THE SPONGES

of the „Willem Barents" Expedition 1880 and 1881.

BY

G. C. J. VOSMAER.

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The Sponges described hereafter were all preserved in spirit. Those which were treated with chromic acid or some similar reagent were in a state that did not allow any investigation whatever. On the other hand some of the Sponges preserved in spirit were also in a bad condition, so that I could only make out something about the skeleton or the spicules. Some on the contrary were very well preserved so that even a few histological details could be observed. This is one of the reasons why I have treated the Sponges in the unequal manner that the reader will notice. Another reason is that I began my task when I was lecturer in the Hague and had much more time at my disposal than is now the case. I feel obliged to apologise. In the middle of 1882 I had the honour to be called as assistant at Prof. Dohrn's Station in Naples and since then I could, of course, not devote very much time to my Polar Sponges. Still I had accepted the task and was thus obliged to finish it. I am convinced that many points more are to be found out with the material I had, but I thought it my duty not to spend more time. I hope the Commitee for publishing the results of the Barents-Expedition will excuse me for having made them wait so long a time and giving them so little.

G. C. J. Vosmaer.

Description of Species.

I. Thenea muricata (Bwk.) Gray.

Loc. 1. Lat. 72° 14'8 N.; long. 22° 30'9 E. (3 specim. N°. 21.)
2. Lat. 72° 36'5 N.; long. 24° 57'5 E. (8 specim. N°. 22.)
3. Lat. 71° 52'2 N.; long. 19° 47' E. (c^a. 40 specim. N°. 23. 180 Fath.)
4. Lat. 72° 9' N.; long. 24° 42' E. (15 specim. N°. 24—25. 145 Fath.
5. Lat. 72° 29' N.; long. 25° 58 E. (? specim. N°. 27, 57. 140 Fath.)

Geogr. distrib. Arctic Ocean; Atlantic Ocean; Mediterranean.
Depth 78—185 Fathoms.
Synon. and literature. 32 and 34.

To the description I gave of this Sponge, I for the moment have little to add. Nearly all the specimens belong to my variety β. From the second and fifth locality there are only two specimens belonging to the var. γ because the roots are strongly ramified, although both these are not so rough by protruding spicules, as to form again a transition between the two varieties. Again an argument in favour of my distinction in subspecies and not in species. The general shape of the 60 or 70 specimens that I had now an opportunity of examining, changes rather much as my diagrams, made after some extravagant specimens, show. I am more and more convinced that I was right in my quoted paper (34) 1° that the species varies immensely in shape, size, colour etc., 2° that the position and number of the oscula, the absence or presence of the „penthouse-apparatus", the number and shape of the roots and the bundles of spicules on the top have no specific value at all. Most of the specimens I saw from our 3^d and 4th Barents-expedition are greyish, as the variety β. nearly allways is. The size varied between 2 c.m. by 3 and 3 by 4.5; SOLLAS (32) has seen still bigger specimens. As a rule there is one osculum on the top, but now and then you find specimens with 2 or 3 oscula. The penthouse was in nearly all open, one time short, another time very broad, in order to form a broad fissure nearly around the whole Sponge; but often there are interruptions and so two or more „equatorial recesses", as SOLLAS calls them, are formed. I am convinced, as I stated before, that SCHMIDT's Tisiphonia fenestrata is not a new species at all, but only a variety in which the recess is often interrupted.

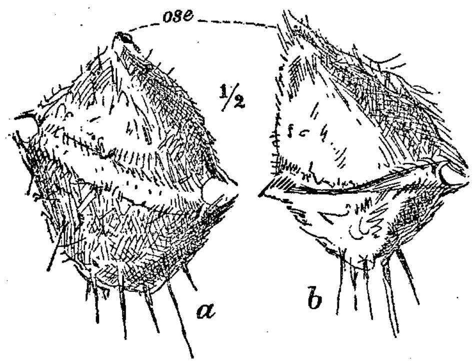


Fig. 1.
Thenea muricata (Bwk.) Gray [N°. 23].
a. Front. *b*. From the side. *osc*. Osculum.

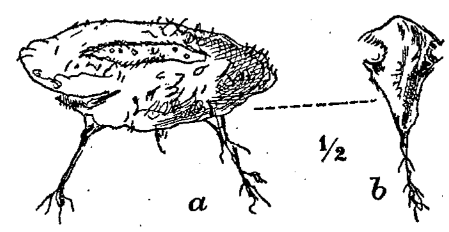


Fig. 2.
Thenea muricata (Bwk.) Gray [N°. 23]
a. Front. *b*. Side.

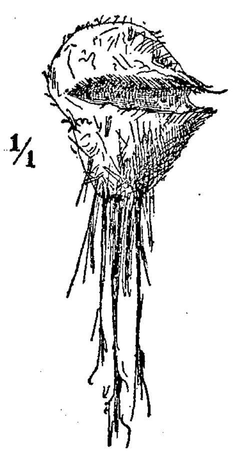


Fig. 3.
Thenea muricata (Bwk.) Gray [N°. 21].

Fig. 4.
Thenea muricata (Bwk.) Gray [N°. 21].

At about the same time that I published the quoted paper, SOLLAS described in his „Sponge-Fauna of Norway" also a Thenea. In most points fortunately we agree, but I cannot follow the distinguished Professor of Dublin in making a specific difference between Thenea muricata and Th. wallichii. We agree that GRAY's name Thenea has the priority and that names as Tisiphonia agariciformis etc. etc. are to been cancelled. SOLLAS was so fortunate to be able to compare original specimens or, where that was impossible, to have the aid of another wellknown English spongiolist, Mr. STUART O. RIDLEY. The latter studied Bowerbank's original specimens in the British Museum, and could in 7 slides not detect the „quadriradiate stellates" in Bowerbank's Th. muricata. For that reason SOLLAS thought it advisible to accept two species, viz. Th. muricata without, Th. wallichii with „quadriradiate stellates." These quadriradiate stellates of SOLLAS are apparently what I called „gigantic stars." I had chosen that name because now and then there are visible more than four rays; five e. g. is not uncommon. As far as I can judge, these stellates are characteristic for my variety α. But, however very rare and even then unfrequent, they do occur in the other varieties. I had occasion to examine a great number of Theneas from different parts of Europe, and after having published my paper I still saw more specimens, and I am always more convinced that Thenea muricata varies immensely in different details. In those cases where in one specimen the „quadriradiate stellates" are frequent we may speak of the variety α. or, if one likes the variety wallichii (SOLL.), but wallichii can never be a specific name for that reason. Since we know how often it happens that we cut off a piece of a Sponge and find a certain particular spiculum, and after some time investigate another part of the Sponge, or another individual, and miss the peculiar spiculum, since we know that such things do not happen once, but happen every time, it may not be a proof for us that in Bowerbank's original Th. muricata the 4-radiate stellates were wanting, because they are not in some of the preparations. I repeat: often I found them not until I had looked for long time and taken different parts and specimens. This proves I think, that the absence or presence of gigantic stars is not important enough for having a specific value. Those specimens which possess them in abundance are *nearly always* smaller, smoother, and lighter. But they are not *always* distinguished by that. In the variety α of Thenea muricata we see perhaps a beginning species. Not without value may be the fact that, as far as my own knowledge goes, in the Barents and Artic Seas there are much more of the variety β, while in the Mediterranean the variety α is by far the commonest.

SOLLAS has given an acurate description of the position of the spicules, of the pores and special pore-groups in the equatorial recess. I have nothing to add to this for the moment. The same author described the system of canals; I am very sorry that his illustrations are not more finished, for there are still to point out many questions, about which I cannot enter into discussion for I do not understand SOLLAS' meaning. Under what kind of canalsystem SCHULZE described so clearly and carefully, does that of Thenea come? Do the ciliated chambers opening directly into the exhalant canals as e.g. in Spongelia or Euplectella? The Sponges I had at my disposal were not well enough preserved for making out histological or even many anatomical details. As far as I know the ciliated chambers are not frequent. The whole tissue of the animal is so „spongeous", so full of holes and lacunae, that there is indeed not very much place for ciliated chambers. On Plate II fig. 1. I have drawn a picture of a section just through the middle of the body, showing how the spicules radiate from the centre, and strengthen the porous soft parts. Besides the canals that SOLLAS described, there are wide lacunae as the figure shows. The spaces between are filled up with connective tissue, as is to be seen in fig. 3 on the same Plate. I am not sure whether the lacunae are all lined by epithelium, but I don't doubt it will be so.

In my preceding paper on Thenea I spoke of tuft-like bundles of needles on the top of some specimens. I have now found that they are the remains of the stalks that carry the buds. Thenea muricata shows a development by means of buds like Tethya and so many other Sponges. Only the stalks are much longer and often there are several buds on one pedicel, which I never saw in other Sponges. The buds themselves begin simply as enlargements of the stalks, and in growing they finally become too heavy and fall down. This may be one of the reasons why so often at one particuliar place of the seabottom there are great quantities of Thenea's all growing together, while a few miles further there are none. I have figured a tuft with the buds on Plate II fig. 2.

II. Stelletta fortis n. sp.

Diagn. Body massive. No wide canals visible on section. No oscules visible. Surface very rough with protruding spicules. Specific spicules: ac^2. | *M. ta.* $\varphi > 90°$ | *st.* | st^2. |
Local. Lat. 71° 55′ 5″ N. Long. 20° 30′ 5″ E. [N°. 91. 179 Fathoms].

Description. The Sponge now under description has no peculiar shape. It forms irregular lumps. The colour, in spirit is brownish red on the outside, ochreous yellow in the inner parts. There it looks like dry old bread without great holes; no wide canals are to be seen. The surface is rough with protruding spicules. The specimen is apparently broken; for that reason I have not figured it, but the remaining piece is big enough for description.

In Stelletta fortis n. sp. there are four kinds of specific [1]) spicules.

*1°. ac^2. [Pl. IV, fig. 32]. They are very numerous, strong, nearly always a little bent in the middle.

*2°. *M. ta.* $\varphi > 90°$ [Pl. IV, fig. 31]. They are also frequent and strong. After these two kinds of spicules I called the Sponge fortis. The shaft (M.) is rather short, measuring often not twice the length of the dentes, sometimes however three or four times, but not more.

*3°. *st.* [Pl. V, fig. 48]. Stellates occur in two forms, viz. small ones and big ones.

*4°. st^2. [Pl. V, fig. 49]. In abundance. Besides there are transitions from the small *st.* to the st^2.

Besides these characteristic spicules I found a few *tr°. ac. sp.*, that probably do not belong to the Sponge.

Stelletta fortis seems to be closely related with Bowerbank's Ecionemia compressa (N°. 1 Vol. II p. 55, Vol. III pag. 19), as far as regards the spiculation. But this Sponge has long slender acerates and smaller inflato-acerates, while our Sponge only possesses ordinary acerates, which are on the contrary very stout.

III. Craniella mülleri. Vosm.

Loc. 1. Lat. 72° 14′8′ N. Long. 22° 30′9′ E. [N°. 11. 165 Fath.]
2. Lat. 72° 36′5″ N. Long. 24° 57′5 E. [N°. 12, 13. 140 Fath.]
3. Lat. 72° 9′ N. Long. 24° 42′ E. [N°. 15. 145 Fath.]

Geogr. distrib. Atlantic (Shetland, Iceland, Florida) and Arctic Oceans.
Depth. 140—183 Fathoms.

Synon. and Literature.
1789 Alcyonium cranium var? Müll. (19, pl. CLVII, fig. 1, 2).
1842 Tethea cranium. Johnst. (9, p. 83).
1864,'66 Tethea cranium. Bwk. (1, Vol. I. p. 182, Vol. II p. 83).

[1]) The terme „specific spicules" or „spicula indicantia" was used and explained by me in (34) p. 2. They are marked with an *.

1866 Tethya cranium. O. S. (27, pl. I, fig. 14).
1867 Tethya cranium. GRAY. (5, p. 543).
1870 Tetilla cranium. O. S. (29, p. 66).
1871 Tethya cranium. CRTR. (p. 104).
1872 Tethya cranium. CRTR. (p. 149).
1874 Tethya cranium. BWK. (p. 315).
1882 Tetilla cranium. (MÜLL.) SOLLAS (32, p. 149).
non:
1789 Alcyonium cranium. Zool. Danica. (Pl. LXXXV, fig. 1).
1815 Tethya cranium. LMK. (10, p. 71).
1816 Alcyonium cranium. LMX. (11, p. 347).
1818 Spongia pilosa. MONT. (18, p. 119).

In the well-known Zoologia Danica Pl. CLVII, Figs. 1, 2, a Sponge is figured that is most probably the Sponge I will now describe and to which nearly all authors gave the specific name of „cranium." In MÜLLER's description however there was no name for this Sponge, but after his death the editor of his works added, that it might be a variety of Alcyonium cranium. [1]) Anybody will agree with me that there is no doubt that this opinion is wrong. So it is impossible to use for our Sponge the specific name cranium. LAMARCK and LAMOUROUX say that their Tethya and Alcyonium cranium are identical with MÜLLER's Alc. cranium; for that reason we have again nothing to do with their names. Then General MONTAGU published in 1818 a paper, where he describes his Spongia pilosa, which may be MÜLLERS Alc. cranium. [figured on plate LXXXV of the Z. D.] but in no case identical with the Sponge under description. Thus neither the specific name cranium, nor pilosa can be used. We want a new name: I propose therefore the name Mülleri after the celebrated author of the Zoologia Danica. This for the specific name. — In 1870 OSCAR SCHMIDT brought the Sponge under his genus Tetilla, proposed by him in 1868 for T. polyura. On the same page however he founded a new genus viz. Craniella of which he gives the following diagnosis: „Spongien vom Habitus der Tethyen, mit fibröser Rinde und den Nadelformen der Tetillen besonders den dreizinkigen Gabeln." Probably SCHMIDT had never seen specimens of the so-called Tethya cranium, otherwise he would have placed it under the generic name of Craniella and not of Tetilla. The diagnosis of Craniella seems to be made just after T. cranium. SOLLAS, who gave the last and best description of our Sponge, first [2]) called it also Tetilla cranium; but afterwards [3]) he is inclined to include the Sponge under Craniella. Thus, for the generic name we agree, but for the specific name, as I stated, I think SOLLAS is wrong.

To his excellent description I have not very much to add. Unfortunately his figures are a little too diagrammatic; I think to do right in trying to give some more detailed figures on my plate II, although they are far from sufficient.

SOLLAS believes provisionally that the outermost layer of the Sponge is formed by a „cuticula", and that the mixed cellular layer beneath it is a „heterogeneous ectoderm". In the specimens that were at my disposal I have never seen cells that seemed to be epithelium and I am therefore of opinion that the ectodermic layer is lost. SOLLAS does not admit the possibility that the whole ectodermic epithelium was lost in his specimens, and so he calls the layer of cells, that

[1]) „Alcyonium globosum fibrosum flavum setosum. Cum descriptio huius tabulae nulla inventa esset in schedulis cel. Vahl determinare nescio an beat. Auctor varietatem voluerit Alcyonii cranii, an novam esse speciem." Zoologia Danica. Vol. IV, p. 42.

[2]) l. c. p. 149.

[3]) l. c. p. 427.

lines the outer surface of the Sponge and the subdermal cavities ectoderm. He finds in some of those cells spicules and in others none; therefore he calls the ectoderm heterogeneous. I think on the contrary it is not at all impossible that the ectoderm was not present in his Sponges. I can hardly believe that the cells so accurately described by SOLLAS, are epithelium-cells or of ectodermic origin. Everybody knows how difficult it is in certain Sponges to preserve the ectodermic epithelium. Often I could not detect it in specimens carefully preserved until I used another method of preservation. For the moment however I am nor yet sure whether the change of preparation-method or the object itself was the cause. I think it not at all improbable that many Sponges here and there, do not possess the original (larval) ectodermic cell-layer but for some time want all covering or possess secundary epithelial cells or a cuticula secreted by cells of the connective tissue. METSCHNIKOFF (17) once has gone too far, but his theory of the loss of the extoderm in Sponges may be partly true, and VON LENDENFELD (14) has just described Sponges where the epithelium is thrown away and afterwards renewed and where in the meantime, the Sponge secretes a cuticle. So it never can surprise us if we do not find an epithelial layer in Sponges gathered together on an expedition where so great care can hardly be taken. Simply from mechanical reasons the thin outer cells may disappear.

SOLLAS describes very characteristic the „dermal mesodermic layer" [Pl. II, fig. 10, α] as having the „appearance of spotted muslin." It seems to me that my objects possess a stronger developed dermal mesodermic layer with smaller subdermal cavities than SOLLAS' specimens. The difference however may be caused by a different state of contraction.

Under this layer we find the „fibrous layer" [Pl. II, fig. 10 β]. In the connective tissue of α nearly all the cells were round; only a few fibres (in the neigbourhood of the long spicules) were present. In the layer β the relation is just the reverse. Numerous fibres go in concentrical directions. Although the fibrous layer is well marked between the dermal mesodermic layer and the mark, the cells forming them show all imaginable transitions. The round cells of the layer α I have figured in fig. 11. In the neigbourhood of the fibrous layer they become more and more elongated as is shown in fig. 12 *a* and *b*, till finally in the middle of the layer β they assume a shape given in fig. 13 *a* and *b*. In this form a nucleus is not always to be seen. I think SOLLAS need not say that this layer is „probably" a fibrous connective tissue; it seems to me beyond doubt.

The communication of the ciliated chambers with the inhalant and exhalant canals has remained a mystery to me as also to SOLLAS.

As for the development of Craniella mülleri I have not seen much more than the distinguished Professor of Dublin. He figures and described a well developed specimen. My figure 14 on Plate II shows a much younger stage. Spicules were visible, but no trace of canals, ciliated chambers, or subdermal cavities. Hardly a differentiation between the mark and the rind has begun. The whole consists of a mass of granules, not of distinct cells. I consider them as cells in statu nascenti, as we so often find in embryos. The granules apparently group themselves and begin to differentiate. They have not all the same size, as is shown in the figure. In fig. 15 I have figured two of these cells more highly magnified one with a probable nucleus.

The skeleton consists of bundles of long spicules radiating from the centre of the Sponge, but not remaining in one linial direction. The bundles are bent in a curved line, and, approaching the surface, they divide fanlike, pierce the fibrous layer and become the tops of the „tents" formed by the skin [figs. 9 and 10, Pl. II]. The fibrous layer is besides strengthened by short radiating acerates. The roots if they may be called so, consist of long bundles of acerates and *M. ta.* $\varphi < 90^{\circ}$, field together by a little parenchym.

The following kinds of spicules were found.

*1. *M. ta.* $\varphi < 90^\circ$. [Pl. V, fig. 1.]	The shaft *M* is very long; the teeth *d* on the contrary stout and short. This kind of spicule is abundant in the root.
*2. *M. ta.* $\varphi > 90^\circ$. [Pl. V, fig. 2.]	*M* and *a* always thinner than those of the first kind. The teeth (*d*) are unequal; the longest however has never twice the length of the shortest. The relation thus is 1,... to 1. Plenty of them are projecting through the skin.
*3. ac^2. or *ac.* . . . . A.	The diameter much greater than that of the shaft of 1 and 2. In the bundles in the inner parts of the Sponge as well as in the long hair-like roots these l o n g acerates are very abundant.
B.	The diameter smaller than that of the shaft of 1 and 2. These s h o r t acerates occur in the fibrous rind. I think SOLLAS is quite right in homologising the ac^2. with the *gl.* of the G e o d i d a e.
*4. ∽	They are allways small and thin.

IV. Tetilla polyura. O. S.

Loc. 1. Lat. 75° 20'5 N. — Long. 46° 40' E. [N°. 17 and 18. 150 Fath. 1880.]
2. Lat. 72° 36'5 N. — Long. 24° 57'5 E. [N°. 29. 140 Fath. 1881.]
3. Lat. 77° 7' N. — Long. 49° 37'5 E. [N°. 30. 170 Fath. 1881.]
Geogr. distrib. Arctic and North Atlantic Oceans. Depth. 85—170 Fathoms.

OSCAR SCHMIDT described in 1870 (29, p. 66) a new little Sponge which he called T e t i l l a p o l y u r a. As is the case with this author so often, the description consists only of a few lines; still I think the Sponge I now mention may be identical with SCHMIDT's specimen. The size however is much larger. In figs. 1—3 on plate I it is shown that not only the size but also the shape is varying, a fact about which we are no more astonished. In SCHMIDT's figure the osculum is on the top. I have seen many specimens where this is the case, but also some where it is on the side; in fig. 2 on plate I there is one on the side and another on the top. In my specimens the papillae from which the spicules are protruding are comparatively not so well developed as in SCHMIDT's Sponge, figured in (29) on plate VI, fig. 8.

The spicules are aranged in a peculiar way, that however wants much more investigation than I now have been able to do. As is shown in fig. 16 [Pl. II] they start from one centrum, the bundles however are not going in strait direction, but in a spiral one. Thus you never can cut the Sponge through the axis without cutting across the bundles. And this is as a rule possible e. g. in T e t h y a or C r a n i e l l a were the bundles are bent but seldom go in spirals.

As SCHMIDT states in a few lines and only a part of a figure, the following spicules occur.

*1. *M. ta.* $\varphi > 90^\circ$ [Pl. V, figs. 3—5],	very frequent, the heads protruding from the surface. The relation in length between the unequal teeth (*d*) is at least as 1 : 2 but often as 1 : 5 or 6. *M.* is very slender, terminating in a fine point.
*1. *M. ta.* $\varphi < 90^\circ$ [Pl. V, fig. 7].	The shaft (*M.*) very long and thin, terminating in a fine point.

*3. *ac*^{2}. [Pl. V, fig. 6.]. . . . . . . With transitions to

4. *ac. ac.*. . . . . Both considerably varying in size.

*5. ∽ . . . . I never found them so rough as SCHMIDT describes this curious spicules in Craniella tethyoides o. s., figured in (29) fig. 9. Pl. VI.

V. Synops pyriformis. VOSM.

Loc. Lat. 71° 52'2 N. Long. 19° 47' E. [N°. 38. 180 Fath.]
Geogr. Distrib. Neighborhood of Hammerfest.
Depth. 135—180 Fathoms.

The specimen measures 9 cM. in height and 10 cM. in its greatest diameter.

To my description, given in (34) p. 20—23 I now have only to add that I again found the *tr°. ac.* My doubt whether these spicules belonged to Synops or not has lessened. Still I am not yet willing to consider them as specific for S. pyriformis.

VI. Geodia Barretti. BWK. (char. emend. SOLLAS).

Loc. 1. Lat. 71° 55'5 N. Long. 18° 30' E. [N°. 48. 177 Fath. 1881].
2. Lat. 72° 14'8 N. Long. 22° 30·9 E. [155 Fath.].
Geogr. distrib. Atlantic (BWK.) and Arctic Oceans.
Depth. 135—177 Fathoms.

The size of the first specimen is 6 cm. in height and 5 cm. in diameter; that of the second measured 14 cm. in diameter. I received only a fragment of this Sponge but probably the specimen was just cut through the middle. In another fragment I saw two „oscular tubes." It may be that this latter fragment belonged to the former.

N°. 1 has a reddish-violet, N°. 2 a more greyish colour. It is worth noticing that N°. 1 shows, on the surface, opposite to the „oscular tube", unmistakable fragments of bundles of root-spicules. Thus these Geodias live probably fixed in the mud by means of bundles of spicules in the same way as Tetilla, Craniella etc. The enormous size and thus the considerable weight of the Sponge may be the reason that in the specimens dredged with the trawl etc. these fine roots have been broken by the movement of the Sponge.

VII. Tethya lyncurium.

Loc. Lat. 72° 9' N. Long. 24° 42' E. [145 Fath.]
Geogr. distr. Adriatic, Mediterranean, Arctic Sea.
Depth. 25—145 Fath.

The single little specimen that I have received, and that perhaps is a different species from lyncurium, possesses curious roots. This possession of roots is not a specific character for Tethya. In the common T. lyncurium it is not described by the different authors, but I found in the Bay of Naples now and then ordinary Tethyas with roots. It depends probably upon the condition of the object on which it grows.

VIII. Stylocordyla borealis. (LOV.) WYV. THOMS.

Loc. 1. Lat. 72° 29' N. — Long. 25° 58' E. [N°. 50. 140 Fathoms].
2. Lat. 72° 14'8 N. — Long. 22° 30'9 E. [165 Fath.]

Geogr. distrib. Arctic Sea.
Depth. 100—300 Fathoms.
Synon. and Literature.

1868. Hyalonema boreale Lov. (13.)
1868. Ficulina boreale Gray. (7, p. 484.)
1872. Hyalonema longissimum Sars. (24, p. .)
1873. Stylocordyla boreale Wyv. Thoms. (33, p. 414.)
1873. Stylocordyla longissima Wyv. Thoms.
1876. Polymastia stipitata Crtr. (2, p. 393.)

Notice also.

1877. Marenzeller (15, pp. 9—12).

Marenzeller has given an account of the synonyma of Styl. longissima. But I think he has not gone far enough, as I am convinced that Sars' Hyalomena longissimum and Loven's H. boreale are only varieties of the same species. Wyville Thomson stated that the generic name Hyalonema was wrong for both, and called them Stylocordyla, but accepts two species, and Marenzeller agreed with him. According to Sars the difference between the two species lies chiefly in the proportion in length of the head and the pedicel, in the position of the osculum and the mode of ramification of the spicule-bundles in the head. In examining however the specimens I had at my disposal and in comparing them with the discription of Sars' and Loven's species as well as with Marenzeller's, I came to the conclusion that both are varieties, if you like, but never distinct species. The following tabular view may clear this up.

Name.	Shape.	Relation in length from head and pedicel.	Position of Osculum.	Spicules.		
				f°.	ha.	
H. longissimum, Sars.	slender	1 : 6 or 1 : 8	on the side	inflation not very conspicuous.	?	bundles of spicules spread fanlike immediately at the base of the head.
H. boreale Lovén.		1 : 3	on the top	infl. very conspicuous.	rudiments.	bundles of spicules spread fanlike in the middle of the head, to the periphery.
Styl. longissima, describ. by Marenzeller:						
N°. 1.		1 : 7			?	
N°. 2.		1 : 9			?	
N°. 3.		1 : 4. 5			?	
Styl. borealis, specim. under description. (N°. 1.)		1 : 4	on the side	infl. conspic.	not found.	bundles of spicules spread fanlike immediately at the base of the head.

So I think we do better to accept only one species; the specific name borealis has priority. [1])
In my specimens I found the following spicules:

*1. *ac*² *f*°. In using however a high power we see that the points are not very sharp and than it gives us the inprenior of tr². f°.

*2. *ac*² *f*. Some of these are as long as the ac² f°; but besides these there occur small ones, as a rule being bent at one end.

*3. *ac*² (*f*).In the pedical occur very thin acerates.

As I stated, I did not find the curious rudimentary hegaetinellid spicules, but as LOVÉN says that they are very rare and that it is very difficult to see the crossing canals („såsom likväl mycket sällan inträffar" l. c. p. 107), so of course it can not be of great systematical value. The spicules of the stem are packed up close together, surrounded by a sheet of plasma (?) like an umbrelle by its case.

IX. Polymastia hemisphaerica. (SARS) VOSM

Loc. 1. Lat. 72° 12′ N.; Long. 31° 50′ E. [N°. 6. 160 Fath. 1880.]
2. Lat. 72° 14′8 N; Long. 22° 30′9 E. [N°. 7. 165 Fath. 1880.]
3. Lat. 72° 36′5 N.; Long. 24° 57′5 E. [N°. 8. 140 Fath. 1881.]
4. Lat. 72° 9′ N.; Long. 24° 42′ E. [N°. 82. 145 Fath.]

Geogr. distrib. Arctic Sea.
Depth. 140—165 Fathoms.
Synon. and Literature.
1872. Trichostemma hemisphaericum SARS. (24, p. 62).
1877. Halicnemia hemisphaerica MARENZ. (15, p. 15).

MARENZELLER is of opinion that the Sponge described by SARS as Trochostemma hemisphaericum belongs to the genus Halicnemia of BOWERBANK. There can be but little doubt that he is right; whether H. patera BWK. and Tr. hemisphaericum SARS are identical, he can not decide. But as the former possesses a different spiculation from the latter the two specimens are really two species. BOWERBANK described e. g. the short *tr*°. *tr*. which do not occur in SARS' Sponge. Besides that the shape of the spicules of the same formula is a different one. SCHMIDT erected in 1870 the Genus Radiella for a Sponge from Cuba. Although the illustration he gives is not quite like that which SARS gave of his Trichostemma, although he says in the diagnosis of Radiella that no fibrous rind is present, yet in 1880 he writes that Radiella sol O. S. = Trichostemma hemisphaericum SARS. It may be that R. sol O. S. is a very young specimen of SARS' Sponge, where the fibrous rind is not yet developed, but for the moment this is very dubious. In that case it could be inclosed in BOWERBANKS' genus Halicnemia, in the case it is not a young specimen, but a fully developed one, I think they are not at all identical. The specimens however I had to dispose of taught me that there is no generic difference between Halicnemia and Polymastia. In the rind so unequally developed we find the same layers as described by DE MEREJKOWSKI (16) for Rinalda (i. e. Polymastia). The canalsystem is built according to the same principles. The skeleton is identical and the elements of it, viz. the spicules show but small differences. It is true, the size, the shape, the whole external appearance, papillae etc. vary, but these distinctions are of less value in Sponges, than the canalsystem and the skeleton. Often it is even not at all

[1]) As for GRAY's name Ficulina (9, p. 484), the type of which genus was JOHNSTON's Halichondria ficus (9, p. 573), every one will agree with me that there is no question of bringing our Sponge under it.

easy to separate P. mamillaris from P. hemisphaerica. I think that the genera Halicnemia Bwk., Trichostemma Sars and Rinalda O. S. all are to be cancelled and brought to Polymastia being the oldest one. After my description of P. mamillaris and hemisphaerica I hope every body will be convinced.

The specimens I could study vary in shape and size, as is to be seen on Plate I figs. 4, 20 and 21. One time they are very flat, disk-like as in fig. 21, another time they are much thicker or higher, as in fig. 20. In sections through the middle of the Sponge a distinct separation between mark and rind is visible. Fig. 17 on Plate II shows us a section at right angles through the middle of the disk, magnified about five times and fig. 18 a part of it more magnified. In both we see the arrangement of the spicules. From the point were the Sponge is attached to the stone, bundles of long spicules radiate, which divide fan-like near the surface. The peripheral parts of the rind is crowded with short, stout, pinlike spicules, protruding through the surface [Pl. II fig. 18]. Besides these two systems there is another one in the rind where the spicules are lying in tangential direction. We see this system often strongly marked in P. mamillaris. Finally many spicules are lying without order in the connective tissue. The following kinds of spicules occur:

*1. *tr°. ac. f.* [Pl. V, figs. 10, 13, 16.]	Short, rather stout, now and then bent or curved. They are very abundant in the rind, where they are protruding for about half their length. Many transitions to *tr. ac.*, are visible. Also thinner ones (fig. 15) occur.
2. (*tr°*). *ac.* (*f*) *tr°. ac.* (*f*) etc.	
3. (or *3?) *tr°. ac.* (*f*).	These are longer than the first ones. They are not very common.
*4. (*tr°*). *ac. f* and (*tr°*). *ac.* (*f*) [Pl. V, fig. 14.]	Longer than N°. 3, but shorter than the last ones. They occur in the bundles with
*5. (*tr°*). *ac.* (*f*) [Pl. V, figs. 11 and 12.]	Very long. The longest occuring at the margin. Many transitions with more or less distinct head or fusiform shape are to be seen.

The Canal-system recalls in many points that of Aplysina aërophoba. Ndo. The surface of the animal is covered with fine pores. From these go off minute canals, that unite together to form much wider canals or lacunae; from these again narrow canals go off and ramify. That this takes place in the rind will be clear after examination of the figures 20 and 19 on Pl. II. In the mark they enter between the ciliated chambers, each of which receives a twig of the ramifying stems. From the ciliated chambers the shape of which is more or less oval or pear-like small exhalant canals bring the seawater into bigger canals which, always uniting, finally form the main stems and apparently open on the papillae. The number and size of the papillae vary. As a rule, big specimens possess more than small ones. The wide canals are nearly always divided by membranes and strings of plasma (to see figs. 19 and 20) which probably serve for changing the size of the lumen. The main canals are surrounded by some layers, *sit venia verbo*, of connective tissue. The small ones on the contrary have only a very thin sheet; the ciliated chambers nearly touch the canaliculi. In the whole mark the connective tissue is sparingly developed. In sections that are not very thin one can hardly see more than ciliated chambers, packed together and between them canals. As I said before around the wide canals more connective tissue is to be seen. The number of ciliated chambers must be very great as they are exceedingly small, the average size of their greatest diameter being only about 27 μ.

As regards the histology we have to say something more about the rind. The connective tissue of that part of the rind, which covers the upper half of the Sponge, that is to say the part that is free, is nearly always thicker than the lower part, this being very much reduced on the spot where the Sponge is fixed [Plate II, fig. 17]. The former consists of a hyaline mass with numerous cells [Plate III, fig. 1]. The outer, i. e. the peripheral parts are so crowded with spicules that hardly any cell is visible, but more internally the well-known cells are abundant. At about the middle of the rind besides the cells there come also a few fibres, which increase in number till they predominate at the inner limit of the cortex. Thus an indubitable „fibrous rind" is present in P. hemisphaerica. In the rind on the other (fixed) side of the Sponge we see far fewer fibres and the cells have more prolongations in different directions in order to form a fine network. But the principal difference is the occurence of vesicular cells. In figs. 2—5 on Pl. III, I have figured different stages of these curious cells. A single look over those illustrations will be sufficient to see that we have here to do with a form of connective tissue such as OSCAR HERTWIG described (8) in the mantle of Tunicates. In my paper on Leucandra aspera H. (37) I said that I had found cells with large vacuoles and compared them with LEYDIGS' „Blasenzellen." In Leucandra however these cells did not occur in such an apparent way as in this Polymastia and I therefore only said: „Vielleicht haben wir hier mit einer Art blasigem Bindegewebe zu thun" (l. c. german translation p. 154). After what I said of this Polymastia there can be no longer any doubt that the same kind of vesicular connective tissue occurs in Sponges.

X. Polymastia mamillaris. (MÜLL.) BWK.

Loc. 1. Lat. 75° 20'5 N.; Long. 46° 40' E. [N°. 1, 3. 150 Fathoms.]
2. Lat. 71° 18' N.; Long. 42° 41' E. [N°. 2 120 Fathoms.]
3. Lat. 77° 7' N.; Long. 49° 37'5 E. [N°. 4. 170 Fathoms 1881.]
4. Lat. 72° 29' N.; Long. 25° 48' E. [N°. 5. 140 Fathoms 1881.]

Geogr. distrib. Atlantic, Arctic, Mediterranean. Adriatic Sea.
Depth. 1—170 Fath.
Synon. and literature.

1806. Spongia mamillaris O. F. MULL. (vol. IV, pag. 44. Tab. CLVIII.)
1882. Polymastia penicillus (Mont.) VOSM. (34 p. 26.)
non: 1842. Halichondria mammillaris JOHNST. (9 p.)

In my paper on the Sponges of the first and second Barent's Expedition [1]) I described specimens of BOWERBANK'S Polymastia mamillaris, but changed the name into P. penicillus for reasons there given. The rich material I now had to dispose of, taught me however that MONTAGU'S Sponge and MÜLLER'S Sponge are probably (.. nobody can be sure) but varieties, not distinct species. Thus I have to call the Sponge under description P. mamillaris. (MÜLL.) BWK.

The normal shape of this Sponge seems to be that of a disk, measuring from 4—12 c.m. in diameter, and about 2 c.m. in height. The lower side, i. e. where the animal is attached to little stones is convex, the upper part flat or a little concave. Between the numerous specimens of the normal shape there are some more globular; a very curious one, figured in woodcut 5 had papillae on the whole surface. A section taught me that, as usual, one side was with, the other without papillae, and that the latter was invaginated. Nearly all the specimens were fixed to little pebbles (Pl. III, fig. 10), that is to say to stones much smaller than the Sponge. On Plate I, figs. 5

[1]) For more Synonimes and literature see l. c. p. 26, 27. Dr. C. DE MEREJKOWSKI was kind enough to send me a fragment of his Rinalda arctica, and I am now sure that it is indentical with *Pol. mamillaris* BWK.

and 6 I have represented a variety, fixed on a big stone, the latter being bigger than one of the stones on which the normal forms are attached. There is another point of difference between the two varieties viz. that the shape of this variety is not disk-like, but more conical or like the segment of a sphere. Another variety is fixed on worm-shells; I described and figured one in my Report on the Sponges of the Willem Barents (34). If one likes, one may accept thus three varieties: — var. α. big disks, fixed on small stones; papillae rather thin; var. β. smaller ones, a little more convex, fixed on worm-shells; the margin bears very long thin spicules; and var. γ. the papillae-bearing-side convex; fixed on stones larger than themselves; papillae shorter and thicker than in var. α. As there are however many transitions and on the other hand the given characters are not of great value, one is obliged to bring them all under one species.

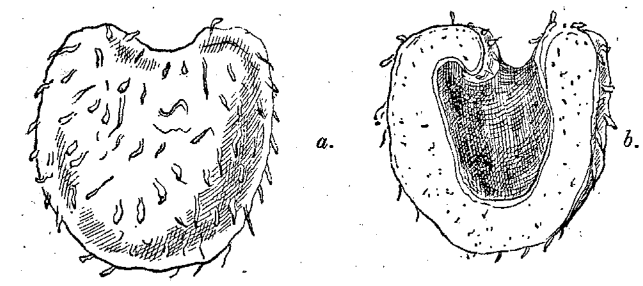


Fig. 5.
a. Outside. *b.* Section through the middle of the body.

Between the papillae there is a layer of sand-particles, mud and small animals. They cannot be moved without great trouble. The reason of this is, that numerous small and a few long spicules project from the surface. Only by breaking the spicules off, can the sand and mud be moved. In sections prepared after the celebrated GIESBRECHT-method the spicules with the sand and the animals are to be seen in situ. A part I have represented in fig. 11 on Plate III.

The canalsystem of Polymastia mamillaris BWK. agrees in many points with that of WEBERELLA. [1]) The pores do not seem to be very numerous. They are the beginnings of narrow inhalant canals that pierce the rind, changing but little their original vertical direction (Pl. III, fig. 11). In P. hemispherica we saw that the narrow canals communicated with wider ones or lacunae, from which again narrow canals start. In P. mamillaris the inhalant canals remain narrow through the whole rind, only ramifying at the inner parts of this. In WEBERELLA we have as a rule the system of Polymastia, now and then however a formation of a little wider canals as in P. hemispherica. WEBERELLA thus stands between the two. The inhalant and exhalant canaliculi seem to have about the same small diameter. The ciliated chambers are more ellipse-shaped, not pear-shaped. The narrow exhalant canals often unite with the broader ones in a rather curious way, viz. at about right angles. So at a transverse section through the main afferent canals often narrow ones are to be seen radiating towards them (Pl. III, fig. 21). This also occurs now and then in WEBERELLA but by no means so distinctly.

In his paper on the Sponges of the White Sea (16), de MEREJKOWSKI describes canals lying in a granulous mass. He says l. c. p. 9: „Après cette troisième couche on ne voit plus que de longues spicules en faisceaux entourés de parenchyme d'une nature granuleuse, composé de protoplasme avec des cellules qui y sont implantées sans aucune trace de structure fibreuse et traversé par des canaux sans endoderme." In comparing this description with his illustration, there can be no doubt that he is quite wrong; I think de MEREJKOWSKI's material was not well preserved. His „parenchyme d'une nature granuleuse" is the mark consisting of ciliated chambers with their canals lying in connective tissue and strengthened by the long bundles of spicules. In Polymastia, as in WEBERELLA the limit of the mark is an undulating line, the rind filling up the spaces between the arches (in sections) of the mark. A glance at the figures 18 on Pl. II or 11 and 6 on Pl. III will make me understood. The connective tissue of the mark is not so developed and compact as in WEBERELLA. Again I cannot agree with de MEREJKOWSKI when he says that there are only cells and that there is no trace of fibrous structure

[1]) To be described hereafter.

The cells now and then have so little intercellular substance that they nearly touch one another. I think the tissue of Clione (i. e. Vioa) stationis NASSONOW (20) must agree in many points with this. As regards the spicules and their arrangement I have nothing to add to de MEREJKOWSKI's and my descriptions. I am very sorry that none of my specimens showed gemmules, so well described by the Russian author.

Finally I will put forward again the resemblances and differences between P. hemisphaerica and mamillaris.

In both the rind consists of 1. a layer of short pinlike spicules, (in connective tissue); 2. a layer of fibrous connective tissue without or with very few spicules; 3. a layer of spicules in tangential position, 4. a thin layer of connective tissue without spicules, being the limit of rind and mark. In a big specimen of P. mamillaris (No. 1) the rind measured 1.2 mm. In P. hemisherica only 0.8 mm. But in another specimen of P. mamillaris (No. 5) it was but 0.3 mm. thick. Specimens of P. mamillaris from the Mediterranean and the Adriatic showed transitions enough between N°. 1 and N°. 5, so the thickness of the rind cannot be of specific value. In N°. 5 the layer of tangential spicules was very conspicuous, in N°. 1, 2, and 3 not. Thus again the indistinctness of it in P. hemisphaerica has not a specific character. As a rule the bundles of long radiating spicules divide (in sections) fanlike in P. hemisphaerica and not so widely in P. mamillaris, but also in this point there are transitions. On the other hand the papillae are always much longer in P. mamillaris than in P. hemisphaerica; the shape and size of both Sponges is different; the small *tr°. ac. f.* are thicker and more fusiform in the latter, and finally occur in the former the extraordinay thin and long (*tr°.*) *ac.*

XI. Polymastia capitata. n. sp.

Loc. Lat. 72° 14'8 N. — Long, 22° 30'9 E. [N°. 28. 165 Fath.].

Diagnosis. Globular. Papillae very short. Specific spicules: *tr°. tr.* | *tr°. ac.* (*f.*), the latter ones of two sizes.

The spherical body measures about 2 cm. in diameter, and shows all the characters of a Polymastia. Only in the shape of the spicules I found a specific distinction, because the shortness of the papillae never might be considered so. These spicules are:

*1. *tr°. tr.* [Pl. IV, fig. 25]. I called the Sponge P. capitata after the remarkable heads of these spicules. In other Polymastiae the heads of the large spicules are rather indistinct. BOWERBANK described a Sponge that he named Halicnemia patera and figures some spicules of it. The Sponge I now have to describe shows some resemblance in the shape of these spicules. Under the head of the spicule, there are sometimes one or more inflations to be seen; and also at the other blunt end often the spicule is inflated, in order to form *tr°. tr°.* etc.

* (*tr°.*) *ac.* (*f.*) [Pl. IV, fig. 27] having about the same size as the first kind.

* (*tr°.*) *ac.* (*f.*) [Pl. IV, fig. 28] measuring about 1/10 of them.

XII. Weberella bursa. n. g.

Loc. 1. Lat. 72° 36'5 N. Long. 24° 57'5 E. [N°. 9. 140 fath.].
2. Lat. 72° 14'8 N. Long. 22° 30'9 E. [N°. 19 a. 155 fath.] [1]).

Geogr. distrib. Arctic Ocean.

Depth. 140—155 Fath.

Synon. and Literature.

Alcyonium bursa? MÜLL. (19 Vol. p. 43. Tab. CLVIII figs 1, 2).

[1]) It may be that both bottles are from the same locality No. 1. Of course this is of little value.

The Sponge in the Zoologia Danica described as „alcyonium subglobosum pulposum viride" bears there the name A. bursa? The editor has found the figure without description and so he is in doubt whether the name he gives is right. The figures on Plate CLVIII agree perfectly well with our Sponge, and so I think both are identical. The generic name of course is to be changed and as I cannot bring my Sponge to any of the existing genera I propose for it the new name WEBERELLA in honour of Prof. MAX WEBER who found it in the Barents-Sea. The diagnosis of WEBERELLA may be this:

Massive, globular, very compact. The surface covered with stout, short papillae. On sections a rind is nearly always distinguished from the mark. Main canals surrounded by compact connective tissue. Canalsystem of the fourth type. Spicules acuate or pin-shaped.

The numerons specimens brought home vary considerably in size, measuring from 2—10 c.m. Nearly all the specimens are fixed upon stones, with the whole under-surface attached to them (Pl. I, fig. 12). In making a section through the middle, two parts are distinguishable viz. the mark and the rind. The limit between both these is not always distinct, but as a rule the former is more yellowish, the latter more bluish white, often more or less transparent. In the mark spots are visible that have the same bluish white colour; in the middle of these, canals are nearly always to be seen (Pl. I, Fig. 19).

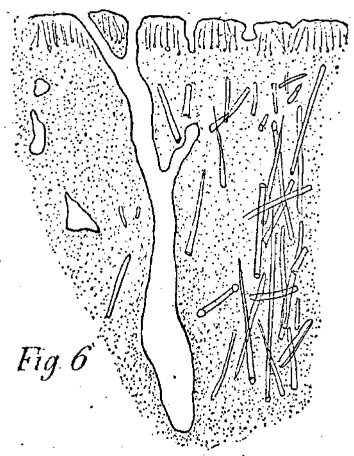


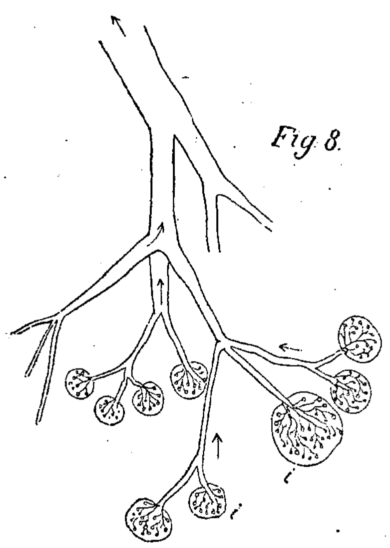
Fig. 6

The Canalsystem of Weberella bursa is in the main points the same as that of Polymastia hemisphaerica. Numerous narrow canals penetrate the Sponge [Pl. III, fig. 8] and join together always increasing in diameter, as the next woodcut shows. In the inners parts of the rind however, they ramify in order to enter the mark again as numerous narrow Canals. In P. hemisphaerica we have seen that the narrow canals end abruptly in canals that are much wider. Here we see that the wide canals are formed by confluence of numerous small ones. This seems to be the normal case. It also occurs that narrow canals open into much wider ones abruptly, and then the relation in both Sponges in still greater. The mark is nearly filled with ciliated chambers, which are pear-shaped, the efferent and afferent Canals are both narrow, about as in Chondrosia etc. (Pl. I, Fig. 9). The smaller canals are lying between the ciliated chambers the main ones within a thick sheet of connective tissue. There is another thing that is especially remarkable in Weberella viz. the distribution of the ciliated chambers.

A section through the mark seen under a power of about 100 shows us that this consists of connective tissue feebly stained, and in this mass, islands of deeper stained cells are to be seen. An examination with a higher magnifying power teaches us that these „islands" are conglomerations of ciliated chambers (Pl. III, Fig. 15). Thus the exhalant canalsystem consists of ramifying canals like the branches of a bunch of grapes each ending in a voluminous mass, i in fig. 8 each of which consists of a secondary bunch with secondary grapes, viz. the ciliated chambers. The next diagram (fig. 8) may clear this up. The excurrent canals finally open in the hollow short papillae. A section through the latter is to be seen on Plate III, Fig. 6. They are merely prolongations of the rind, showing the same histiological details and the same skeleton-elements.

The whole Sponge as well as the inhalant canals are covered with flat epithelium (Pl. III, Figs. 7 and 8). The epithelium of the excurrent canals and of the ciliated chambers has never been very distinct in my preparations. The collar cells seem to be rather small and low; the epithelial cells of the canals on the contrary are rather high. But I am not at all sure whether my interpretation of the elements around the main excurrent canals as epithelium-cells is right.

The connective tissue of Weberella is highly developed, giving to the Sponge its compact and resistant properties. The tissue of the rind shows the well-known cells with



ramifying and anastomosing processes, a quantity of intercellular-substance and only sparingly fibres, showing by this latter quality a striking difference with the rind of P. hemisphaerica. In the connective tissue in the mark, especially developed around the main excurrent canals, there is also much intercellular substance, and a few more fibres, but the cells with ramifying and anastomosing processes which occur in the rind are much rarer. Instead of them there are bigger cells with rather highly refringent granules in them, lying in kind of holes of the intercellular substance. As they have also plasmatic processes they recall the cartilage of some cephalopods although the shape of the cells is different from those [Pl. III, fig. 20].

The Skeleton consists of bundles of sub-pinlike spicules (Pl. III, figs. 16 and 17). In the middle of the papillae they are parallel to its surface, i. e. perpendicular to the surface of the Sponge. As the shape of the whole Sponge is more or less globular and the papillae, although more frequent on the top, occur everywhere so the arangements of the bigger spicules is more or less radiating, the spicules in the mark following the direction of those of the papillae. The whole outer surface of the Sponge and the papillae is strengthened by smaller sub-pinlike spicules (Pl. III, figs. 18 and 19). In Polymastia we see the same with this distinction that they are projecting to the surface in that Sponges and remaining totally covered by the epithelium in Weberella (Pl. III, figs. 26 and 28). Only a few protrude. The following spicules occur:

*1. (*tr*°). *ac.* (*f.*) [Pl. III, figs. 16 and 17].	Forming the skeleton in the mark and the inner parts of the papillae.
*2. *tr*°. *ac.* (*f.*) [Pl. III, figs. 18 and 19].	Much smaller, forming the skeleton of the outer parts of the papillae and the surface of the body. They are very little fusiform.
3. (*tr*°). *ac. f.*	Between the other forms, not being of specific value. If they occur in a great mass, which I never saw, a variety could be made.

XIII Thecophora semisuberites. O. S.

Loc. Lat. 72° 36·5 N.; Long. 34° 57·5 E. [N°. 16. 140 fath. 1881.)
Geogr. distrib. N.-Atlantic and Arctic Seas.
Depth. 128—140 Fathoms.

The specimen Oscar Schmidt has illustrated apparently was mutilated. The specimens I described some years ago (34 p. 30) all resembled Schmidt's figure; but among those I saw afterwards a few that showed a kind of broad thin base, by means of which the Sponge is fixed to stones or rocks. Vertical sections (woodcut 9 and Pl. I, fig. 24) teach us that on this thin basal-plate arises a short cone. Both consists mainly of spicules cemented together with a little connective tissue. This cone gives off bundles of spicules in a direction parallel to the axis. Near the upper-surface they spread a little. The rind, which is thicker on the head (*h*) than on the sides (*s*) is formed of connective tissue, strengthened by spicules. In the rind on the sides the spicules have a tangential direction; in that of the top however they are placed vertically to it. In the woodcut the spicules are figured by lines, the mark by points As regards the shape of the different spicules I refer to my mentioned paper. Now I only will add that the shortest pin-like spicules occur especially in the upper-rind.

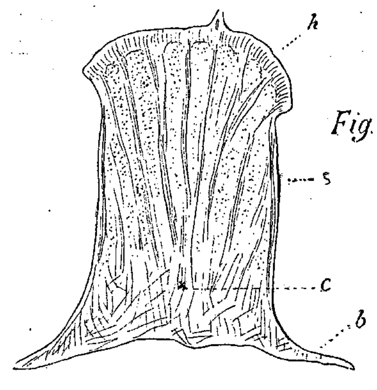


Fig. 9

h = head. *s* = side.
b = basal-plate. *c* = cone.

The inhalant Canalsystem of Thecophora agrees in all principal points with that of Weberella and Polymastia. The upper surface of the Sponge is covered with a layer of sand-particles; therefore the pores are not visible with a simple lens. In sections we see however clearly that they are the entrances of short narrow canals who, uniting together finish in much wider subdermal-cavities from which again narrow canals, now ramifying, start and enter the mark [Pl. III, fig. 22]. This is the rule; an exception is that they are long and that the subdermal eavity is small or absent. Still it is remarkable that this exception occurs, and it shows again how little fixed even valuable anatomical characteristics in Sponges are. I refer to the fact, mentioned above, that similar exceptions occur in Weberella and Polymastia. As in those genera we see in Thecophora that the wider excurrent (?) canals come into the main ones at about right angles. The ciliated chambers are much larger than in P. and W. Probably they open with a wide mouth into the excurrent canals. I regret very much not having been able to make out this point beyond any doubt.

We saw that a head and a column may be dintinguished in Thecophora and that the head bearing the short oscular papillae is covered with sand. In sections we saw that this head has a thicker rind. Examining this rind under a rather high power we see that the structure differs in many points. So we have again a differentiation of different parts of the rind, a differentiation that goes however farther than e. g. in P. hemisphaerica.

The rind of the head consists of connective tissue becoming more and more fibrillar towards the mark. On its inner limit two systems of fibres are visible viz. one going in a radial an other a in concentrical direction. This rind is here covered with columnar epithelium, a fact that is new. As far as we know Sponges now, all the outer ectodermal epithelium was flat [1]. Here in Thecophora the cells are more or less cylindrical often broader at the top than at the base, varying rather much in height [Pl. III, fig. 23]. The cells lining the walls of the subdermal cavities are also rather high, but never so distinctly columnar, cylindrical as those of the upper surface of the Sponge [Pl. III, fig. 24]. Besides I found them lining the wider (ex-or incurrent?) canals in the mark [Pl. III, fig. 25]. Some times the nucleus is lying in the upper-part, but as a rule it lies in the basal part of the cell [Pl. III, fig. 23]. I am inclined to believe that these cells on the outer surface secret a slimy substance by means of which sand-particles and little animals are stuck to it. The sand there may have a defensive meaning, the animals are probably nourishment; but what may be the advantage of the sand that here and there fills up the narrow canals?

The rind that covers the column of the Sponge is destitute of these high cells and seems to be covered by ordinary flat cells. Sand never is attached to it. Also here the tissue is a connective one and also here the fibrillar structure is stronger at the inner part. The fibres in bundles run in a tangential direction a few perpendicular to this. Between them many fusiform cells are visible [Pl. III, fig. 26]. Close under the surface there seems to be one large subdermal cavity and not as on the top-rind several wide lacunae.

This highly developed system of fibres in different direction makes us think that in the living state the animal in able to change considerably its volume (and shape?). That the main canals may change their lumen vertical sections show [Pl. III, fig. 25]. We see that the high epithelium-cells are fixed on a strongly fibrillar tissue. The fibres run in concentrical direction; if they contract the canal may be shut up wholly or at least partly. These canals, with the beginning of proper walls are lying in ordinary cellular connective tissue. The cells around it have a different

[1]) It s not yet made out whether the external epithelium of *Halisarca dujardini* is a true columnar epithelium.

shape. It is remarkable that the fusiform cells lie in a direction radial in regard to the canal. Also some, but not many fibres are lying so. Both of course have to help in opening the canal.

XIV. Quasillina brevis. (BWK.) NORMAN.

Loc. 1. Lat. 72° 14'8 N.; Long. 22° 30'9 E. [N°. 79. 165 Fath.].
2. Lat. 72° 9' N.; Long. 24° 42' E. [N°. 81. 145 Fath.].
3. Lat. 72° 29' N.; Long. 25° 58' E. [Fragment. 140 Fath.].

Geogr. distrib. N. Atlantic and Arctic.

Depth. 40—165 Fathoms.

Synon. and literature.

1861 Euplectella brevis BWK. (1 p. 71).
1866 Polymastia brevis BWK. (1 Vol. II p. 64 Vol. III p. 26, Vol. IV p. 31).
1875 Bursalina muta O. S. (28 p. 116).

The Sponge under description, according to NORMAN first described by BOWERBANK as Euplectella brevis afterwards by the same author as Polymastia brevis, neither belongs to the former genus nor to the latter as will be clear enough after reading my note. NORMAN, erected a new genus Quasillina for it, and I think he was quite right. His diagnosis was the following (21 p. 329): „Sponge consisting of a single clavate hollow body, widening upwards from the base, and rising at once from the surface of the stone to which it is attached, without any expanded basal mass. Skeleton beautifully reticulate, primary fasciculi ascending in parallel straight lines from base, and in diverging radiating lines from a central mammaeform projection at the summit of the Sponge, secondary fasciculi at right angles, to the primary ones. Spicula fusiformi acuate." And of the species he says: Q. brevis = Polymastia brevis BWK. Frequent on pebbles in from 40—170 fathoms. The spicula are needle-shaped (acuate) swollen in the central part, and attenuated towards the „head" as well as towards the point; but then are not „acerate" as described by Dr. BOWERBANK, the head end being blunt and rounded. The smaller spicules sometimes assume a slightly pin-shaped („spinulate") form." I should like to add that besides „fusiformi acuate" spicules also acuates occur, and that they are arranged in three systems at about right angles. Finally that the canalsystem belongs to my third type.

OSCAR SCHMIDT described in 1875 a Sponge that he thought quite new and that he named therefore Bursalina muta. There can be little doubt that his specimen, badly preserved as it was, is identical with NORMAN's Quasillina. SCHMIDT says that „dieser neue Schwamm sich an keine der bekannten Gattungen anreihen lässt . . ." Had he known better the Sponge-literature he himself would never have stated this. On the contrary the Sponge had already three names. Such things often occur, I am sorry to say. My own observations on Quasillina are the following.

The shape and size of this elegant Sponge varied in my specimens in a way best visible on Plate I figs. 7. *a—d*. I never saw an opening on the top larger than those where the seawater enters. Still there was always a central axial canal. The inner mass is very soft the rind on the contrary very hard and strong by the amount of spicules and their particular arangement. As it is easy to separate the rind from the soft pulpous mark, the skeleton of it may be studied easily. I have illustrated the arangement of the bundles of spicules in Fig. 1 on Plate IV. In the pedicel we see about 6 or 8 bundles of large, strong spicules in a direction vertical to the axis of the Sponge. There where the body of the Sponge begins the bundles divide themselves always remaining more or less parallel to each other. Vertically placed to these bundles goes another system, running in a concentrical or tangential direction. Also these spicules are thick and rather long. Finally there is a third system of spicules arranged perpendicular to both. These spicules however are much smaller and thinner and occur in groups, as is best to be seen on Plate IV, fig. 2. In that transverse section the long longitudinal bundles are marked with *a*, the concentrical with *b* and the small radiating spicules that project through the surface with *c*. The mark contains only a few spicules dispersed without any visible order. So we see that NORMAN's name Quasillina [1]) is well chosen and on the other side we may understand that people who classified too much according to the skeleton viz. the arangement of the spicules could bring the genus under Euplectella.

All the spiculcs belong to the pin-or sub-pinlike type.

1°. *tr. ac. f.* and (*tr°.*) *ac. f.* Forming the longitudinal and tangential bundles.

2°. (*tr°.*) *ac.* and *tr°. ac.* Short, but not stout, radiating.

Besides there, are although not frequently, spicules in size between 1 and 2. The former kind of spicules in about 7 or 8 times as long as the latter one. The size of the third kind is about ²/₅ of that of the long ones. As regards the shape of the type-spicules I refer to BOWERBANK.

The canalsystem of Quasillina seems to belong to my third type. In the cortex we find thin canals the beginnings of which are the pores. These canals finish in wider ones, the subdermal cavities; the latter communicate with a system of cavities just under the rind (cortex) which cavities may be named with SOLLAS' terminology: subcortical crypts. From the subcortical crypts the water comes in rather wide ramifying canals and lacunae, communicating with the ellipsoid ciliated chambers by means of pores („Kammerporen" F. E. S.) These ciliated chambers open with a wide mouth in the wide excurrent canals, which unite in still wider lacunae, [Pl. IV, Figs. 2 and 5].

The rind is nearly filled up with spicules; the connective tissue is sparingly developed. Only a few fibres occur. The connective tissue of the mark is also little developed: the ciliated chambers nearly touch one another.

As to the generative products, I only found spermatozoids in different stages of development. Still it may be that Quasillina is hermaphroditic, but that the male and female products are not ripe at the same time. As regards the mode of development of the spermatozoids, Quasillina agrees perfectly with Sycandra raphanus H., where Poléjaeff detected and described them. In my paper on Velinea (38) I stated I had seen them in different Sponges. This mode of spermatogeneses seems to be very common.

XV. Suberites. spec.

Loc. Lat. 72° 36'5 N.; Long. 24° 57'5 E. [N°. 66. 140 Fathoms.]

I cannot bring this Sponge to one of the known Suberitides. Still I am not inclined to make a new genus as there are so many species hardly described at all. For that reason I have not given a new name to it, but illustrated it on Pl. I, Fig. 9 *a*, *b* and Pl. IV Fig. 33.

The pin-shaped spicules *tr°. ac*, [Pl. IV, fig. 33] vary in size. They are situated in bundles almost in the middle of the Sponge following the axis of the Sponge-body, and in radiating bundles thus vertical in the axis.

XVI. Inflatella? spec.

Loc. Lat. 72° 29' N. — Long. 25° 58' E. [N°. 51. 140 Fath.]

SCHMIDT described (28) in 1875 a new Sponge from Bukenfjord, Norway, that he called Inflatella pellicula. This description (?) is the following: „Die vorhandenen 5 Exemplaren sind längliche Blasen von grünlichen Farbe. Sie sind entweder bloss mit dem einen Ende der Körperwand angewachsen, oder auch noch durch einige platte, in Spitzen ausgezogene Fortsätze

[1]) Quasilla, a basket.

befestigt. Am oberen Ende finden sich 2—4 Fortsatze, entweder geschlossen oder auf dem Gipfel mit einer Oeffnung versehen. Die Blase enthält eine, sie nur zum geringen Theil ausfüllende Parenchymmasse, deren Structur nicht weiter erkannt wurde. Die darin enthaltenen Nadeln sind meist an einem Ende etwas angeschwollen, am anderen Stumpf zugespitzt." (l. c. p. 117.) I think my Sponge belongs to this genus. But nobody of course will wonder that I am by no means sure. About the most important characters of the Sponge SCHMIDT says nothing. He does not speak at all of the canalsystem and does not give any figure of spicules.

Of the single specimen that was at my disposal I have given an illustration on Plate I, fig. 8. As is to be seen there it is growing on a stone; on the top there are numerous rather pointed prolongations. Also in my specimen some of these are open other are shut; thus they are probably a kind of oscular-apparatus, strengthened by spicules. The spicules in the dermis are lying in a horizontal position, those of the prolongations perpendicular on them. In the inner mass, consisting of connective tissue with a few cells but much intercellular substance the spicules are rare and without order, except in the case where bundles start from the bottom of the Sponge and end in the prolongations. The canalsystem seems to belong to my third type; the subdermal cavities are not very much developed; the canals or lacunae are wide, and the ellipse-shaped, rather big ciliated chambers are very few in number. Between the connective-tissue-cells there are other cells of various size but always larger than the former ones. They have an irregular shape and rather pointed prolongation, in shape much resembling ganglion-cells. I am inclined to believe that they are eggs. The spicules occuring in the Sponge are:

*1. ac^2, *(f)* [Pl. V, fig. 17] stout, with transitions to.
2. ac^2. and ac^2. *f.*
*3. tr^0. *tr.* *(f)* [Pl. V, figs. 18 and 19] thinner.

XVII. Tedania suctoria. O. S.

Loc. 1. Lat. 74° 30' N.; Long. 26° 3' E. 180 Fath.
2. Lat. 74° 36' N.; Long. 24° 47'5 E. 112. Fath.

To my description in (34) p. 42. I have nothing to add now.

XVIII. Cribrochalina sluiteri. VOSM.

Fig. 10.

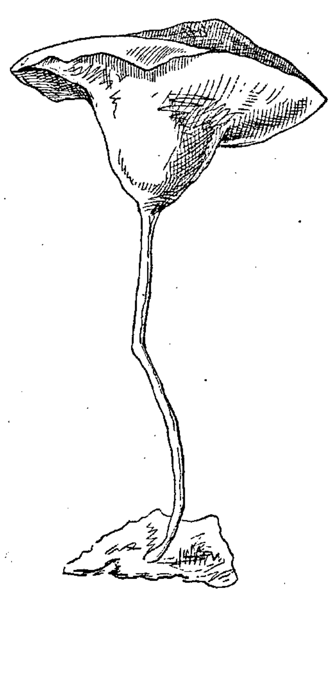
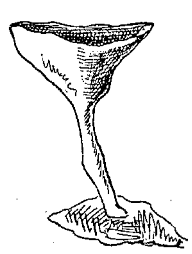


Fig. 11.



Loc. 1. Matosjkin-Shar. [N°. 43. 37 Fath.]
2. Lat. 77° 7' N.; Long. 49° 37'5 E. [N°. 44. 170 Fath.]

Geogr. distrib. Barents-Sea.
Depth. 37—170 Fathoms.
Literature. (34) p. 39.

The specimen I described some years ago was fan-shaped. Those I had this time for investigation were funnel-shaped; so what I expected appeared. Also these specimens are of a greyish colour [1]).

[1]) It may be that the Sponges called „Bägarspongior" in STUXBERG's „Evertebratfaunan i Sibiriens Ishaf", and figured there on p. 710 is also a Cribr. sluiteri. But as no *description* at all is given I can not be sure; this is also the reason why I have not mentioned the title of the book in my report on the literature for 1882. (Jahresber. Zool. Stat. Neapel.)

The Size of the Sponges varies in the following way:

	1.	2.	3.	4.
length of pedicel:	? (broken)	5 c.m.	1.5 cm.	3 c.m.
greatest diameter of funnel:	15 c.m.	4 c.m.	2 c.m.	2.5 c.m.
height of id:	7.5 c.m.	2 c.m.	1 c.m.	2 c.m.
	N°. 43.	N°. 44.	N°. 44.	N°. 44.

In sections at right angles to the surface the structure of the Sponge is to be seen. The soft parts are very soft indeed; and the skeleton only gives some strength to the animal, although not very much. The spicules are partly lying in bunales parallel to the surface, partly dispersed without any visible order through the body. The long bundles, from time to time bent towards the surface, where they ramifying strengthen the subdermal cavities [Pl. IV, Figs. 4—6]. The great quantity of sand dispersed through the whole Sponge-body may serve also as skeleton. Besides the system of spicules mentioned there is another one forming a thin peripheral layer. There is little difference between the outer and the inner part of the funnel-skeleton; the spicules of the former only projecting much farther that those of the latter [Pl. IV, figs. 6 and 5].

As regards the canalsystem, I unfortunately could not make out very much. The water enters by means of pores and comes directly into wide, rather regular subdermal cavities (*s. d. c.* in fig. 5) and then into wide canals, which here and there, form large lacunae (*a* in fig. 4). It is rather remarkable that on the orther, inner side similar subdermal cavitiest exist; only their openings are as a rule (not all) larger [Pl. IV, fig. 6]. The condition of the specimen at my disposal did not allow the ciliated chambers and their communication with the incurrent and excurrent canalsystem to be seen. Still I believe that the subdermal cavities on the inner side belong to the excurrent system.

XIX. Chalina. spec.? [N°. 75].

Loc. Unknown.

It is impossible to give a detailed description of this Sponge because it is only a fragment. Besides, for the moment the Chalineae and Renieridae are so badly described and their characters so vague that I think it better not to give a special name to this Sponge. The spicules are acerates; sometimes the end is more or less teat-shaped, another time it is simply pointed. These rather streng spicules are imbedded in a corneous matter in bundles.

XX. Auletta elegans. Vosm.

Loc. Lat. 77° 7 N.; Long. 49° 37'5 E. [N°. 85. 170 Fath.]
Geogr. distrib. Barents-sea.
Depth. 160—170 Fath.
Literature. (34) p. 40.

XXI. Phakellia ventilabrum. Bwk.

Loc. Lat. 72° 14'8 N.; Long. 22° 30'9 E. [N°. 87. 165 Fath.]
Geogr. distrib. Arctic and Atlantic Oceans. Mediterranean?

Depth. 50—500 Fathoms.

The specimen measures about 9 c.m. in height and 6 c.m. in breadth, the pedicel being about 2.5 c.m. long.

XXII. Phakellia bowerbanki. n. sp. var. α.

Diagnosis. Great, thin, fan- or funnelshaped species. Skeleton-fibres strong. Specific spicules *tr. ac.*

Loc. Lat. 72° 36'5 N.; Long. 24° 57'5 E. [N°. 40. 140 Fath.]

It is dubious whether it is wise to bring the specimen under description to Phakellia. Perhaps it is better to call Phakellia only those Sponges where the spicules are flexible (geschlängelt"). SCHMIDT, CARTER, RIDLEY etc. take it however in a wider sense; for the moment I will follow them in order to make as less alterations as possible.

All the specimens of Phakellia bowerbanki are big and thin. Most of them are torn. The spicules [Plate V, figs. 45—47] are acuate (*tr. ac.*), stout. A few between them are thinner, having however the same length. As a rule they are bent or curved.

XXIII. Phakellia bowerbanki. var. β.

Diagnosis. Great, thin fan-shaped. Purple-coloured. Skeleton-fibres not much developed. Specific spicules *tr. ac.*

Loc. Lat. 72°. 14'8 N.; Long. 22° 30' E. [N°. 72. 155 Fath.].

I have figured this big fan-shaped Sponge red-coloured in spirit, on Plate I fig. 18. The skeleton-fibres are present although they are not strong. This may be the reason that the specimen is not complete.

The spicules are the same as in var. α (compare figs. 39 and 45—47 on Pl. V).

Sections at right angles to the surface show a system of wide canals, some of which pass through the Sponge from one side to the other. Also in Phak. Bowerbanki. I could not detect ciliated chambers. As long as I have not studied Phakelliae which I have preserved myself, being sure that they were living in the moment they came in alcohol, I will not pretend that they really do not exist. But it may be suggested here as a possible fact that those thin fan-shaped Sponges are destitute of them because they do not want them. Every good section shows us that the water can flow through and through the body, the natural movement of the water being probably sufficient for bringing new living-material to the Sponge. (Fig. 12).

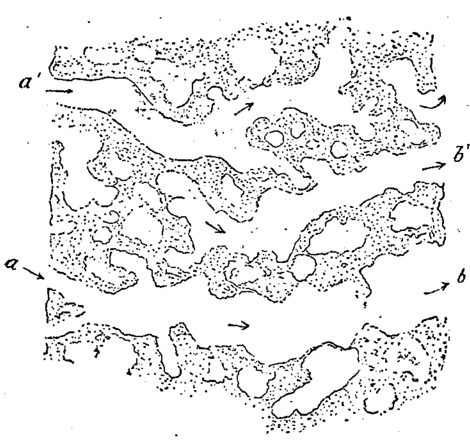


Fig 12

Diagram of the canalsystem of Phak. bowerbanki. *a*, *a'* entrances of incurrent canals; *b*, *b'* id. of excurrent ones; *ab* canal passing from one side to the other.

The excurrent and incurrent openings differ in size and shape, the former being much wider and having a more irregular shape [Pl. IV, fig. 7], than the latter ones [Pl. IV, fig. 8].

XXIV. Phakellia arctica. n. s.

Diagnosis. Fan- or funnel-shaped. Fibres rather strong. Specific spicules: *ac*² and *tr*².
Loc. 1. Lat. 72° 14'8 N.; Long. 22° 30' E. [N°. 86. 165 Fath.]
2. Lat. 72° 36'5 N.; Long. 24° 57'5 E. [Idem. 140 Fath.]

What I said about Ph. Bowerbanki, I now repeat for Ph. arctica. Only because we do not know enough now of the Phakelliae, in how far the species vary, so I am obliged to make again a new species, distinguished from Ph. Bowerbanki by the possession of acerates.

The spicules belonging to the Sponge are:
*1. ac². [Pl. V, Fig. 26]. Stout acerates, slightly curved, frequent.
*2. tr². [Pl. V, Fig. 27, head]. Frequent.
3. tr ac. [Pl. V, Fig. 25]. Rare.

XXV. Acanthella multiformis. n. sp.

Diagnosis. Fan- or funnel-shaped or ramified. Spicules in fibres. Specific spicules: *ac*² and *tr. ac.*
Loc. 1. Lat. 72° 14'8 N.; Long. 22° 30'9 E. [N°. 88. 165 Fath.]
2. Lat. 72° 36'5 N.; Long. 24° 57'5 E. [N°. 63, 68. 140 Fath.]

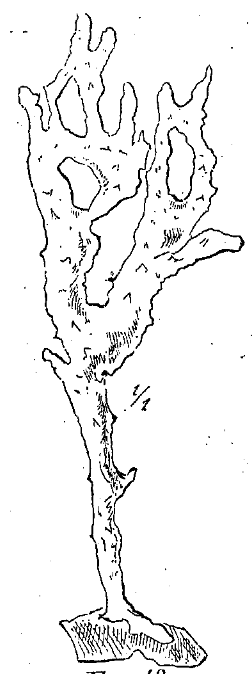


Fig. 13.

Fig. 14.

I had various specimens of this Sponge at my disposal, each having a different shape. Some are funnel-shaped, other fan-shaped, a third kind is ramified (fig. 13) or cup-shaped (fig. 14). The surface one time is rather smooth, another time about as thorny as a Spongelia.

There is only one kind of spicules viz.
* *ac. ac.* [Pl. IV, figs. 9 and 10]. In observing them with a low power it seems to be *tr. ac.* The fact is that one end is obtusely, the other one sharply pointed. All spicules are bent, curved or flexible („schlangenförmig gebogen.")

XXVI. Artemisina suberitoides.
n. g.; n. sp.

Loc. Lat. 72° 36'5 N.; Long. 24° 57'5 E. [N°. 14. 140 Fath.]

Diagnosis of the Genus. Body covered with a thin dermis forming here and there thin oscular-tubes. Sponge-mass rather compact about as Suberites). Generic spicules *tr. ac.* | ⋀ *sp.* | *anc*². |

Diagnosis of the Species; Body globular, fixed on stones. Specific spicules: (tr°.) ac. | ⋀ sp. | anc.² |

As for the external characters of this Sponge, I refer to Plate I, fig. 16. The shape, the compact substance, the rather smooth surface, this all gives to the Sponge the appearance of a Suberites.

SCHMIDT described a Suberites with spined bows viz. Sub. arciger. Our Sponge however possesses little anchors, characteristic for the Desmacidinae, and does not posses tr^2. So it is not to be identified with SCHMIDT's Sponge. Whether Sub. arciger o.s. belongs to my genus Artemisina — is another question in favour of which there is much to say.

Artemisina suberitoides has an irregular spherical shape. The Sponge-mass being rather compact only a few main canals are visible on sections (Pl. IV, fig. 12, *c*). On the smooth surface I could not see pores; on the top a few thin papillae show the places where the seawater comes out. Although the pores are not to be seen with a simple lens, they are without doubt present as is shown by thin sections studied under higher power [Pl. IV. fig. 13]. A very thin membrane covers the Sponge; in this membrane are the pores, which lead to a kind of subdermal cavity. From these cavities the water comes in the ramifying canals. (Pl. IV, fig. 13.) The ciliated chambers are elliptical. Probably the canalsystem is built according to the fourth type, i. e. the chambers possess narrow, short ex- and incurrent canaliculi. I say probably because my preparations are not sufficient to make the question out.

The skeleton of Artemisina consists of three elements, all well known in the family of the Desmacidinae, to which of course the Sponge under description belongs. The spicules are kept together by a very slightly developed keratode or pseudo-keratode (RIDLEY).

The following spicules occur.

*1. (*tr*°.) *ac.* [Pl. V, figs. 55, 52, 53] with transitions to
2. *tr. ac.*, and
3. *tr. ac.*
*4. ⋏ *sp.* [Pl. V, fig. 51], The spines only occur on the extremities as in Suberites argicer o. s. and Clathria lobata VOSM.
*5. *anc*². [Pl. V, fig. 54, *a*, *b*], The anchors are very small, and very frequent.

In cutting the Sponge across you see a number of embryoes [Pl. IV, fig. 12 *e*]. In thin sections seen through the microscope other smaller ones are to be seen too. It is a rather curious fact that they do not vary very much in histological structure. In the youngest stages I saw simply a heap of granules; no trace of a nucleus was seen [Pl. IV, fig. 11]. These eggs (?) or whatever they may be, grow and divide themselves in two or more heaps, always without showing a nucleus. Some stages farther, again a simple collection of large and small granules is to be seen, still without differentiation. Finally a central and a peripheril part is to be distinguished and at the latest stage I could observe, there is a central mass of the mentioned granules, surrounded by a layer of more or less distinct cells. It must be noticed that there is only a partial contact between both parts. On one side I always saw a hyaline uncoloured mass (fluid?) [Pl. IV, fig. 14]. The younger as well as the other stages are lying in a hole lined by endothelium-cells. As far as I know there is no analogy in other Sponges with this mode of development.

XXVII. Forcipina bulbosa. (CRTR.) VOSM.

Loc. Lat. 72° 36'5 N.; Long. 24° 57'5 E. [N°. 20. 140 Fath.]
Geogr. distrib. Atlantic (BOWERBANK, CARTER) and Arctic Oceans.
Depth. 140—374 Fathoms.
Synonyms and literature.

Halichondria forcipis BWK. 1866 (1. I p. 244, II p. 105).
Halichondria forcipis var. bulbosa CRTR. 1876 (2. p. 312).
Myxilla forcipis (BWK.) VOSM. 1880 (36. p. 127).
Myxilla bulbosa (CRTR.) VOSM. 1880 (36. p. 127).
Halichondria forceps BWK. (NORM.) 1882 (1. c. p. 105).

see also: CARTER (2. p. 246).

In my paper on the Desmacidinae I was of opinion that CARTER's variety b u l b o s a was a distinct species 1° because the „forcepiform" spicules were bulbous in one, sharp-pointed in the other species and 2° because in one occured *anc*²., in the other species *rut*². The Sponge I have now to describe possesses both and seems to vary so much that I think to do better by uniting them all. The presence of the curious „compasses" seems to me a reason strong enough for bringing them in a separate genus. As the specific name name f o r c i p i s or f o r c e p s cannot come together with F o r c i p i n a, so I have taken the second name b u l b o s a. It is possible that also SCHMIDT's E s p e r i a a n c e p s (= A m p h i l e c t u s a n c e p s VOSM.) belongs to the new genus F o r c i p i n a. CARTER (2ª) p. 248 speaks of a Sponge called by him F o r c e p i a c o l o n e n s i s. It may be that his genus F o r c e p i a is indentical with my genus F o r c i p i n a; but as he does not give any description or diagnosis of his new genus it seems to me impossible to accept CARTER's name.

I have figured our Sponge on Plate I, Fig. 11. The external characters agree perfectly with those described by BOWERBANK and CARTER for H a l. f o r c i p i s BWK. In my specimens however I nearly always observed thin papillae on the top, simply being prolongations of the dermis-membrane. They are the oscular openings.

The spicules characteristic for F o r c i p i n a are: *(tr°). ac* | *(tr°)*². | *Λ sp.* (NB) | ∞ | *anc*² or (and) *rut*² |. The forcepiform spicules I figured with *Λ sp.* (NB), because I believe they are modified spined bows. As for the specific spiculation the following lines may be sufficient.

*1. *tr. ac.* and transitions to *(tr°). ac.*, *(tr°). ac.f.* etc. [Pl. V, fig. 61].

*2. *(tr°)*². [Pl. V, fig. 60].

*3. *Λ sp.* (NB) [Pl. V, figs. 66—68]. Forcepiform or compasses-like spicules. The distance between the two extremities varies, as well as the length of them, the size of the spines etc. Sometimes the ends are sharply pointed, another time obtuse, even bulbous. As a rule they are much shorter than the rods, but now and then they are nearly as long. It seems that BOWERBANK has figured a variety of that sort.

*4. *anc*². [Pl. V, figs. 63—65], or (seldom and)

5. *rut*² or *rut. rut.*

*6. ∞ [Pl. V, fig. 62]. Rather long.

XXVIII. Myxilla barentsi. n. sp.

Loc. Unknown. (Arctic Sea), [N°. 19, 1880].

Diagnosis. Body spongeous, with large wide holes, covered with a thin membrane. Specific spicules: *tr. ac. sp.* | *ac*². *(sp)*. | *anc*². | ∞ |.

On Plate IV, fig. 15 I have figured this Sponge, as it is covering a P e c t e n - s h e l l. The colour in spirit is yellowish-white.

A section at right angles to the surface [Pl. IV, fig. 15] shows us a system of very wide lacunae. The body is covered with a thin membrane (*m.* in fig. 15). There, where this membrane passes over the immense subdermal-cavities (*s. d. c.* in fig. 15) it is perforate with numerous pores. Here and there large openings, oscula, are visible on the surface of the Sponge [Pl. IV, fig. 16].

The systematic position of M b a r e n t s i is very near to M. b a t e i (Bwk.) VOSM.

The following spicules occur:

*1. *tr. ac. sp.* [Pl. V, fig. 56]. Stout very frequent.

2. *tr. ac. (sp.)*, the spines being so short and few, that the formula nearly is *tr. ac.* Rare.

*3. *ac*². *(sp.)* [Pl. V, fig. 57]. The extremities not very sharp. Only the ends possess little spines.

*4. *anc*². [Pl. V, fig. 58] of different size. As a rule they are large.

*5. ∞ [Pl. V, fig. 59]. Smaller than the anchors.

XXIX. Hamacantha papillata. n. sp.

Loc. 1. Lat. 71° 52'2 N. — Long. 19° 47' E. [N°. 31. 180 Fath.]
2. Lat. 72° 9' N. — Long. 24° 42' E. [N°. 89. 145 Fath.]
Diagnosis. Irregular Sponges with long papillae. Specific spicules: *tr. ac.* (*f*) | ~~∞~~ | *tr*². |

OSCAR SCHMIDT made in 1870 the Genus Desmacella, giving the following diagnosis: „Spongien, welche ausser den gestreckten einfachen Nadeln nur Bogen oder Spangen besitzen. Die Nadeln entweder in undeutlichen Zügen oder faserig geschichtet" (29. p. 53). From the described Sponges he brought Hymedesmia Johnsoni BWK. to his new genus and described two new species. In the same year and in the same book (p. 54) he described a new Sponge that he called Desmacodes subereus, having at the same time the „Habitus" of Papillina suberea O. S. and the spicules of Desmacella. So both are Desmacidinae without anchors (*rut*², *anc*²), possessing besides the rods, only bihamates or bows. Being of opinion that the distinction of the two genera as SCHMIDT made them was not right and that on the other hand Desmacella Johnsoni O.S. was generically different from the other Desmacellae, I modified the diagnoses of the two genera, bringing all SCHMIDT's Desmacellae to his genus Desmacodes with exeption of the mentioned D. Johnsoni. I then made the following distinction. Desmacella: In addition to the rods, only bows and trenchant or strongly recurved bihamates, ~~∞~~ no anchors. Desmacodes: In addition to the rods only bows or ordinary bihamates (∞), no anchors. In the same year 1880, two or three months afterwards, SCHMIDT proposed the same what I did viz. to separate those Sponges with trenchant bihamate spicules from other ones, making the new genus Vomerula for them. As I said before, I am of opinion that Desmacella pumilio O.S. and vagabunda O.S. may easily be brought to Desmacodes so the new name Vomerula is not necessary unless it will be useful to separate the two genera Desmacella and Vomerula according to the absence or presence of anchors (*anc*²). For the moment I will not decide this, but there is another question, viz. that the name Desmacella is to be cancelled because GRAY's genus Hamacantha has priority for three years, being erected in 1867 for Hymedesmia johnsoni BWK [1]).

The new species of Hamacantha, I have to describe now, seems to be very well characterised by the large somewhat teat-shaped papillae [Pl. I, fig. 15 *a* and *b*]. With the exception of these the Sponge is quite covered with sand and mud.

I found the following spicules:

*1. *tr*² (*f*) and transitions to *tr. tr.* (*f*) and *tr. ac* (*f*) [Pl. V, fig. 82].
*2. *tr*². [Pl. V, fig. 83].
3. *tr*². *f*°. rare.
*4. ~~∞~~ [Pl. V, figs. 84—86]. I call special attention to fig. 85, being a „trenchant bihamate" with two teeth. This may be a proof that they are modified „anchors" and not modified bihamates.

XXX. Gellius vagabundus (O. S.) VOSM.

Loc. 1. Unknown. [N°. 74. 1880].
2. Unknown. [N°. 76. 1880].
3. Lat. 72° 36'5 N. — Long. 24° 57'5 E. [N°. 77. 140 Fath.]
4. Lat. 72° 29' N. — Long. 25° 58' E. [N°. 52. 140 Fath.]
5. Lat. 72° 14'8 N. — Long. 22° 30' E. [N°. 92, 47. 165 Fath.]

[1]) GRAY writes l. c. p. 38 Halichondria johnsoni BWK., but this is apparently a misprint.

Geogr. Distrib. Arctic and Atlantic (Florida).
Depth. 98—165 Fathoms.
Synonyms and Literature. (36) p. 108.
Desmacella vagabunda O. S.
Desmacodes vagabundus (O. S.) VOSM.

Gellius vagabundus is one of those Sponges that vary not only in shape or colour but even in their spiculation. SCHMIDT's specimens were varying too in this way, all the more pity that he has not given any illustration at all. Taking those specimens as the type that has the formula: *tr°. ac.* | ac^2 | ∞ | we have now to describe three varieties.

Var. α. (N°. 77, 52, 92, 47) has exceedingly few ac^2.; even in many parts of the Sponge they are absent. The *tr°. ac.* with their spherical heads are figured in Plate V, figs. 28 and 29. They are of different size, straight or curved, now and then a little fusiform. The ∞ are as a rule small and thin; between these [Pl. V, fig. 30] there are big ones [Pl. V, fig. 31].

In var. β. [N°. 76] the spicules are nearly all *tr. ac.* [Pl. V, figs. 32 and 33]. Besides a few ac^2. The rods as well as the bihamates (∞) are varying considerably in size.

Var. γ. (N°. 74) possesses ac^2. [Pl. V, fig. 36] in great quantity. Besides these a few *tr. ac.* The bihamates are of two kinds, large ones [Pl. V, fig. 38] and small, ordinary ones [Pl. V, fig. 37].

All these varieties have an irregular shape and wide canals and subdermal cavities. The thin skin is there, where a subdermal cavity is, perforated with numerous pores [Pl. V, fig. 30].

GRAY's name Gellius has priority to SCHMIDT's Desmacodes.

XXXI. Gellius arcoferus. n. sp.

Loc. 1. Lat. 77° 7' N. — Long. 49° 37'5 E. [N°. 83. 170 Fath.]
2. Lat. 72° 36'5 N. — Long. 24° 57'5 E. [N°. 84. 140 Fath.]
Diagnosis. Flat (fan-shaped?) body. Wide canals. Specific spicules: ac^2 | ∞ | Λ |.

All the specimens that were at my disposal were only fragments. They were all flat big pieces; the original shape probably has been that of a fan. One specimen is fixed on a stone. In making a section through the Sponge it seems that one half gives much more resistance than the other one. There, the canals are rather regularly piercing the Sponge-body at about right angles. In the other part (below the line A. B. in fig. 18 on Pl. IV) the canals are wider and irregular. Observing the surface of the strong part of the Sponge with a lense, the cylindrical regular canals are to be seen, covered by a thin, perforated membrane [fig. 19, Pl. IV]. Some of the canals pass the Sponge-body from one side to the other. The following spicules occur:

*1. ac^2. [Pl. V, figs. 87 and 88], rather stout. The length is about the same in different specimens, the diameter on the contrary varies much.
2. *tr. ac.* Very rare.
*3. ∞ [Pl. V, fig. 89]. Small.
*4. Λ [Pl. V, fig. 90].

XXXII. Gellius infundibuliformis n. sp.

Loc. 1. Lat. 72° 36'5 N. — Long. 24° 57'5 E. [N°. 37. 140 Fath.]
2. Lat. 71° 52'2 N. — Long. 19° 47' E. [N°. 37. 180 Fath.]
Diagnosis. Rather compact, funnel-shaped. Walls thick. Specific spicules: *tr. ac.* | *tr°. ac.* | ∞ |

The external appearance of this common Sponge is to be seen on Pl. I, fig. 13. The shape is always more or less funnell-like although not as e. g. in Cribrochalina infundibuliformis or Cribr. sluiteri. In these Sponges there is a short or long thin pedicel with a large thin-walled funnel. In Gellius infundibuliformis there is a thick compact mass fixed on stones etc. spreading out in order to form a kind of thick walled funnel or cup [Pl. IV, fig. 34].

The curious rather regular subdermal cavities, descibed in Cribrochalina sluiteri also occur in Gellius.

The spicules are the following ones:

*1. *tr°. ac.* [Pl. IV, figs. 34—36]. The heads are varying in shape as is to be seen in the figures.

*2. *tr. ac.*

*3. ∞ [Pl. IV, fig. 37].

XXXIII. Desmacidon ?

Loc. Lat 72° 9' N. — Long. 24° 42' E. [N°. 45, 145 Fath.]

There is only one specimen of this Sponge. I could not make sufficient observations for determination. Thus I did not give a specific name. Probably it belongs to the genus Desmacidon. The spicules are:

*1. *ac*². [Pl. V, fig. 78]. Long and slender.

*2. *tr*². *sp.* [Pl. V, fig. 79]. They are somewhat bent. Many transitions to

3. *tr. ac. sp.* and *ac*². *sp.* are observed.

*4. *anc*². [Pl. V, figs. 80 and 81].

XXXIV. Esperia lingua (Bwk.) Vosm.

Loc. 1. Lat. 72° 36'5 N. — Long. 24° 57'5 E. [N°. 33, 34. 140 Fath.]
2. Lat. 72° 14'8 N. — Long. 22° 30'9 E. [N°. 35, 165 Fath.]
3. Lat. 75° 13' N. — Long. 15° 46'1 E. [N°. 55, 175 Fath.]

Geogr. distrib. Arctic and Atlantic (Scotland). Mediterranean.

Depth. 140—175 Fathoms.

Literature. (36) p. 146.

In addition to Bowerbank's illustrations of this Sponge I now give fig. 17 [Plate I] for the external appearance, figs. 73—77 [Pl. V] for the spicules and figs. 21 and 22 on IV for the canalsystem.

The most remarkable thing in Esperia lingua is perhaps the incurrent canalsystem. The Sponge covered with sand, shows on its surface numerous fissures that are not covered with sand. In examining the Sponge with a lense it becomes clear that in these places the pores are situated [fig. 22 Pl. IV]. A section through the Sponge shows a quantity of rather wide canals and lacunae, all strengthened by strong horny fibres with the well-known spicules [Pl. IV, fig. 21]. Bowerbank says that the oscula are difficult to detect. It is true that this is often the case but not always. I had specimens where they were immediately seen. In the funnel-shaped specimens e. g. they are congregated on the inner part of the funnel, the incurrent sieves being on the out-side. As regards the spicules, I must add to my formula given in 1880 (36 p. 146) the trichites.

XXXV. Esperia (lucifera O. S.)?

Loc. 1. Lat. 72° 36·5 N. — Long. 24° 57·5 E. [N°. 42. 140 Fath.]
2. Lat. 75° 49·8 N. — Long. 53° 41·5 E. [N°. 46. 68 Fath.]
Geogr. distrib. Arctic Ocean. (Atlantic: Skager-Rack. SCHMIDT).
Depth. 68—140 Fathoms.

SCHMIDT's figures and description are insufficient to determine with certainty our Sponge as Esp. lucifera O. S. As my specimens are in a very bad state of preservation and as I found the same combination of spicules viz. 1° *tr. ac.* with modifications to *tr°. ac.*, 2° *ac²*. („trichites") *rut-rut* and ∞, so I think I do better not to give a new name to our Sponge. In one specimen the horny fibres, including the spicules, are very strong in three other ones they are softer. This Sponge seems to be closely allied to Esperia lingua and Esperia constricta, as regards the shape of the spicules; but it has neither the characteristic surface of E. constricta (comp. my figure in 34 Pl. IV, fig. 153) nor that of E. lingua, with its pore-sieves [Pl. IV, fig. 22].

XXXVI. Alebion piceum VOSM.

Loc. 1. Lat. 77° 7′ N. — Long. 49° 37·5 E. [N°. 36. 170 Fath.]
2. Lat. 76° 51·4 N. — Long. 44° 21′ E. [N°. 49. 145 Fath.]
Geogr. distrib. Barents-sea.
Depth. 170—220 Fathoms.
Literature. (34) p. 42.

In the specimen from the second locality, I could not find the (*tr°.*) *ac.* described by myself as characteristic for the species. I then again examined the original specimen and found that also there, they were often not to be seen, so I believe we do better to cancel this kind of spicule in the diagnosis, giving them only a sub-specific value. Another little distinction of the variety [N°. 49] is the *tr°²*. *f.* (*sp.*) or even *tr°²*. *f.* instead of *tr°²*. *f. sp.*

XXXVII. Melonanchora elliptica CRTR.

Loc. 1. Lat. 72° 36·5 N. — Long. 24° 57·5 E. [N°. 32, 64. 140 Fath.]
2. Lat. 72° 9′ N. — Long. 24° 42′ E. [N°. 39. 145 Fath.]
Geogr. distrib. Atlantic (Scotland, CARTER. Caraibean Sea, SCHMIDT). and Arctic Oceans.
Depth. 140 Fath. (Deep Sea, CARTER).
Literature. 2ª p. 212 and 30 p. 85.

CARTER described this interesting Sponge in 1874 and since that time only SCHMIDT has described it in 1880. The former said that the Sponge was „composed of a stiff, glistening, bladder-like dermis, enclosing a soft fibreless parenchyma", and that this dermis was „formed of a wove-like texture, composed of linear spicules, intercrossing each other on the same plane, and held together by tough horny sarcode, corrugated, and presenting rounded tubercles, whose heads respectively are cribriform." I think by this, the Sponge is pretty well characterised and I do not understand how SCHMIDT could say that it consists of a „nach seinem Aussehen sehr uninteressanten unregelmässigen Schwammkörper." On the contrary the surface in Melonanchora is very characteristic and interesting. To CARTER's description I have little to add. His figures on the other hand being very diagrammatic and thus insufficient, so I give some new illustrations. The dermis only here and there is fixed to the Sponge body. So it is easy enough to separate the whole of it from the body. The most remarkable thing to be seen on the dermis are the oscula, which are visible in different states of development and opening. If they are shut they simply form a little tubercle. In some of the opened ones you see that there is one or more little openings in the tubercle. In the larger ones however there is a rather regular system of strong fibres with spicules, between which a quantity of thin fibres are visible in order to form a network of fibres, the water being able to pass through the meshes [Pl. IV, figs. 23 and 24]. CARTER says: „Pores and vents respectively situated in the cribriform tubercles." I do not believe that these apparatusses have anything to do with the pores viz. the incurrent openings.

In my specimens I never found the rods figured by CARTER on Pl. XV, fig. 35 *b*, so sharply pointed. On the contrary they terminate rather bluntly, or are as CARTER himself says „abruptly pointed." For that reason I have not made a new species of the Sponge under description, not even a variety. As for the curious melon-shaped spicules that CARTER thinks are the fully developed stages of the common-shaped anchors also found in Melonanchora I agree with SCHMIDT that these are two different forms of spicules. Thus the spicules occuring in our Sponge are:

*1. tr^2. (f) [Pl. V, fig. 71] with different transitions to

*2. *tr. tr.* [Pl. V, fig. 70], or tr^2, *tr. tr.* (f), $tr^2 f^0$ etc.

*3. *mel.* [1]) [Pl. V, fig. 69], frequent.

*4. anc^2. [Pl. V, fig. 72], rare.

XXXVIII. Spongelia avara O. S.

Loc. Lat. 72° 14'8 N. — Long. 22° 30'9 E. [N°. 41? 90. 165 Fath.]

[1]) I propose the abreviation *mel* (*melo*) for the melon-shaped „equianchorates."

LIST

OF THOSE

DREDGINGS WHERE SPONGES ARE FOUND.

List of those dredgings

Station.	Date.	Locality. Lat.	Locality. Long.	Depth. (Fathoms.)	Temperat. of the water. [2]) (centigr.)	Nature of the bottom.
1881	24/VI	70° 40′ N.	31° 10′ E.	132		
1881	10/VI	71° 55′ N.	18° 30′ E.	177	2.4	Sand with lumps of clay.
	?	71° 55′,5 N.	20° 30′,5 E.	197		
1880	13/VII	71° 18′ N.	42° 41′ E.	120	0.7	Sand with clay and stones.
1881	11/VI	71° 52′ N.	19° 47′ E.	180	1.6	Sand with lumps of clay.
1881	30/VI	72° 14′,8 N.	22° 30′ E.	165	1.9	Clay with stones.
1881	14/VI	72° 9′ N.	22° 42′ E.	145	1.2	Clay with stones.
1880	3/VII	72° 12′ N.	31° 50′ E.	160	2.2	Soft clay with stones.
1881	27/VI	72° 29′ N.	25° 58′ E.	140	1.9	Clayey sand with dark and reddish lumps of clay, and rolled pebbles.

[1]) At the bottom.

[2]) + means ice present on the surface.

— " " absent " " "

where Sponges are found.

Ice. [2])	Names.	Remarks.
—	Tetilla polyura O. S.	
—	Geodia Barretti BWK.	
	Stelleta fortis n. sp.	
—	Polymastia mamillaris BWK., Chalina spec., Myxilla barentsi n. sp., Alebion piceum VOSM., Gellius vagabundus (O. S.) VOSM. var. β and var. γ.	Polymastia very frequent.
+	Thenea muricata GRAY, Synops pyriformis VOSM., Hamacantha papillata n. sp., Gellius infundibuliformis n. sp.	Thenea very frequent.
+	Thenea muricata GRAY, Geodia Barretti BWK., Craniella Mülleri VOSM., Stylocordyla borealis WYV. THOMS., Quasillina brevis NORM., Polymastia capitata n. sp., Polymastia hemisphaerica VOSM., Weberella bursa VOSM., Phakellia bowerbanki n. sp. var. β, Phakellia ventilabrum BWK., Phakellia arctica n. sp., Acanthella multiformis n. sp., Gellius vagabundus, var. α, Esperia lingua, VOSM., Spongelia avara O. S. (?)	Geodia of enormous size, also Weberella bigger than from other localities.
+	Thenea muricata GRAY, Craniella Mülleri VOSM., Polymastia hemisphaerica VOSM., Tethya lyncurium AUTT., Quasillina brevis NORM., Hamacantha papillata n. sp., Desmacidon sp., Melonanchora elliptica CRTR.	Thenea not uncommon.
	Polymastia hemisphaerica VOSM.	
+	Thenea muricata GRAY, Stylocordyla borealis WYV. THOMS., Quasillina brevis NORM., Polymastia mamillaris BWK., Suberites (?) sp., Gellius vagabundus var. α.	

List of those dredgings

Station.	Date.	Locality. Lat.	Long.	Depth. (fathoms)	Temperature of the water. [1] (centigr.)	Nature of the bottom.
1881	28/VI	72° 36',5 N.	24° 57' E.	140	1.7	Clay with stones.
1880	22/VI	74° 30' N.	26° 3' E.	180	2.3	Clay with stones.
1880	23/VI	74° 36' N.	24° 47',5 E.	112	0.6	Clay with stones.
1881	12/VII	75° 13' N.	15° 46' E.	175	0.8	Soft clay with little stones.
1881	10/VIII	Matotschkin-Sharr.		37	— 0.9	Soft mud, clay or sand.
1880	26/VII	75° 20',5 N.	46° 40 E.	150	— 0.1	Clay.
1881	18/VIII	75° 49' N.	53° 41' E.	68	— 1.3	Soft greyish clay with stones.
1881	6/IX	77° 7' N.	49° 37' E.	170	— 1.2	Soft clay with a few stones.
1881	7/IX	76° 51' N.	44° 20' E.	145	— 1.1	Soft clay.

A glance over this list compared with other known facts teaches us the following.

1. In the Barents-sea Calcispongiae and true horn-sponges seem to be very rare.
2. Tetractinellidae, Suberitidae and Desmacidinae are frequent.
3. The number of species is not exceedingly large, but some species (Thenea muricata Gray, Polymastia mamillaris Bwk. and Craniella mülleri Vosm. are very frequent.

A comparison between the Sponge-fauna of the Arctic and North-Atlantic Oceans with the Mediterrenean

[1]) At the bottom.

[2]) + means ice present on the surface.

— " " absent " " "

where Sponges are found.

Ice.[2])	Names.	Remarks.
+	Thenea muricata GRAY, Craniella mülleri VOSM., Tetilla polyura O. S., Polymastia hemisphaerica VOSM., Weberella bursa VOSM., Thecophora semisuberites O. S., Suberites spec., Phakellia bowerbanki n. sp. var. α, Phakellia arctica n. sp., Acanthella multiformis, Artemisina suberitoides n. g.; n. sp., Forcipina bulbosa (CRTR.) VOSM., Gellius vagabundus var. α, Gellius infundibuliformis n. sp., Esperia lingua (BWK.) VOSM., Esperia lucifera O. S. (?), Melonanchora elliptica CRTR.	Craniella and Weberella very frequent. Thenea not uncommen; between the var. β. one var. γ.
	Tedania suctoria O. S.	
	Tedania suctoria O. S.	
—	Esperia lingua (BWK.) VOSM.	
+	Cribrochalina sluiteri VOSM.	
	Tetilla polyura O. S., Polymastia mamillaris BWK.	Polymastia very frequent.
+	Esperia lucifera O. S., (?)	
+	Tetilla polyura O. S., Polymastia mamillaris BWK. Cribrochalina sluiteri VOSM., Auletta elegans O. S., Alebion piceum VOSM., Gellius arcoferus n. sp.	
—	Alebion piceum VOSM.	

prooves that some species are common to both, may be that varieties occur, e. g. Thenea muricata GRAY and Polymastia mamillaris BWK. In some places of the Gulf of Naples the former is not at all rare as var. α. In the Arctic Sea this variety is rare, and the varieties β. and γ. are frequent. As for Polymastia mamillaris BWK. I can state that they become much bigger in the Arctic Sea than in the Gulf of Naples. Craniella mülleri VOSM. and Tetilla poluyra O. S. seem to be characteristic for the Barents-sea. Desmacidinae are frequent in the Arctic sea seldom found in the Mediterrenean.

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PLATE I.

Fig. 1. **Tetilla polyura.** O. S. Nat. size (N°. 17).
" 2. Idem Nat. size (N°. 30).
" 3. Idem Nat. size (N°. 29).
" 4. **Polymastia haemisphaerica.** (SARS) VOSM. Nat. size (N°. 7).
" 5. **Polymastia mamillaris.** (O. F. MÜLL.) BWK. Top view. Nat. size (N°. 5).
" 6. Idem Side view (N°. 5).
" 7. **Quasillina brevis.** (BWK.) NORMAN. Nat. size (N°. 79).
" 8. **Inflatella** (?) spec. Nat. size (N°. 51).
" 9. **Suberites** spec. Nat. size (N°. 66).
" 10. **Cribrochalina sluiteri.** VOSM. × $^{2}/_{3}$.
" 11. **Forcipina bulbosa.** (CRTR.) VOSM. Nat. size (N°. 20).
" 12. **Weberella bursa.** (O. F. MÜLL.) VOSM. Nat. size (N°. 9).
" 13. **Gellius infundibuliformis.** n. sp. Nat. size (N°. 37).
" 14. **Melonanchora elliptica.** CRTR. Nat. size (N°. 32).
" 15. **Hamacantha papillata.** n. sp. *a.* × $^{2}/_{3}$; *b.* single tube × $^{3}/_{1}$ (N°. 31).
" 16. **Artemisina suberitoides.** n. g.; n. sp. Nat. size (N°. 14).
" 17. **Esperia lingua.** (BWK.) VOSM. Nat. size (N°. 34).
" 18. **Phakellia bowerbanki.** n. sp. Var. *β*. Magnif. $^{2}/_{3}$ (N°. 72).
" 19. **Weberella bursa.** (O. F. MÜLL.) VOSM. Nat. size. Section through the middle (N°. 9).
" 20. **Polymastia hemisphaerica.** (SARS) VOSM. Nat. size. Section through the middle (N°. 8).
" 21. Idem Nat. size. Section through the middle (N°. 6).
" 22. **Melonanchora elliptica.** CRTR. Nat. size. Section through the middle (N°. 32).
" 23. **Thecophora semisuberites.** O. S. Nat. size (N°. 16).
" 24. Idem Section through the middle (N°. 16).

PLATE II.

(All Figures are drawn with ZEISS' CAMERA *and projected on the level of the object-stage.)*

H = HARTNACK.

Fig. 1—8. Thenea muricata. (BWK.) GRAY.

Fig. 1. Longitudinal section. × 4.
„ 2. One of the tufts from the top, bearing four buds. H. II Cam. luc. proj. obj. stage.
„ 3. Part of section from fig. 1 (between the dotted straight lines). H. IV. Cam. luc. proj. obj. stage.
„ 4—7. Highly refringent cells of connective tissue. H. VIII. Oc. 3, tube out. Proj. working table.
„ 8. Connective tissue with highly refringent cells, ordinary cells, fibres and stellates. H. VII. Oc. 3. Proj. working table.

Fig. 9—15. Craniella mülleri. VOSM.

Fig. 9. Longitudinal section through the Sponge. Nat. size.
„ 10. Section through the rind and a part of the mark. α soft outer connective tissue, covered by epithelium. β fibrous layer. γ Mark. H. II. C. luc. proj. obj. stage.
„ 11. Connective tissue cells from the layer α. H. VIII. Oc. 3.
„ 12. Elongated id. from the neibourghoud of β. H VIII. Oc. 3.
„ 13. Contractil fibres from the middle of β. H. VIII. Oc. 3.
„ 14. Section through the middle of embryo. H. II. C. luc. proj. obj. stage.
„ 15. Cells (?) from 14. H. VII. C. luc. proj. obj. stage.

Fig. 16. Tetilla polyura O. S. Longitudinal section through the middle of the Sponge. Nat. size.

Fig. 17—20. Polymastia hemisphaerica. (SARS) VOSM.

Fig. 17. Longitudinal section through the middle, a. Rind b. Mark. × 5.
„ 18. id. (partly) H. II. C. luc. proj. obj. stage.
„ 19—20. Section through the upper rind, showing incurrent canals. H. IV. C. luc. proj. obj. stage.

PLATE III.

Figs. 1—5. Polymastia hemisphaerica. (SARS) VOSM.

Fig. 1. Connective tissue of the inner part of the rind. H. VII. C. luc. proj. obj. stage.
„ 2. Vesicular connective tissue of the rind (below). Imm. VII. Oc. 3. Tube out.
„ 3—5. Vesicular cells of id. in different stages of development. Im. VII. Oc. 3. Tube out.

Figs. 6—9 and 15—20. Weberella bursa. VOSM.

Fig. 6. Longitudinal section through one of the papillae, the rind and the mark.
„ 7. Connective tissue with the lining epithelium of the inner wall of the papillae (in fig. 6 between the dotted lines). H. VII. C. luc.
„ 8. Peripheral part of the Sponge (in fig. 6 at *a*). H. VII. C. luc. proj. obj. stage.

Fig. 9. Ciliated chambers with excurrent canals.
„ 15. Section through the inner part of the mark. *a,a.* Islands of ciliated chambers. *b.* connective tissue. *c.* canal. H. II. Cam. luc. proj. obj. stage.
„ 16. (*tr*°.) *ac. f.* H. VII. C. luc. proj. obj. stage.
„ 17. *tr. ac.* (*f*). H. VII. C. luc. proj. obj. stage.
„ 18, 19. Small (*tr*°.) *ac* of the rind. H. VII. Cam. luc. proj. obj. stage.
„ 20. Connective tissue with cell from the rind. Imm. VII.

Figs. 10—14 and 21. Polymastia mamillaris. Bwk.

Fig. 10. Longitudinal section through the whole Sponge. Nat. size.
„ 11. id. through a papilla, rind and mark. H. II. Cam. luc. proj. obj. stage.
„ 12—14. Cells of connective tissue. Zeiss F. Oc. 2.
„ 21. Section through main canal with smaller radiating ones. H. IV. Cam. luc. proj. obj. stage.

Figs. 22—26. Thecophora semisuberites. O. S.

Fig. 22. Longitudinal section through the top-rind. *m.* Mark. H. II. Cam. luc. proj. obj. stage.
„ 23. Columnar epithelium cells from the top-rind. H. VII. Cam. luc. proj. obj. stage.
„ 24. Epithelium-cells from a subdermal cavity. H. VII. Cam. luc. proj. obj. stage.
„ 25. Transverse section of canal with columnar cells, concentric and radiating fibres. H. VII. C. luc. proj. obj. stage.
„ 26. Connective tissue from the inner part of the top-rind.

PLATE IV.

Figs. 1—3. Quasillina brevis. (Bwk.) Norm.

Fig. 1. Diagram of the skeleton of the wall. × 6.
„ 2. Transverse section through the Sponge. *a.* longitudinal bundles of spicules. *b.* tangential spicules. *c.* radiating spicules. *d.* subdermal cavity. *e.* subcortical crypt. *f.* inhalant canal. H. II. Cam. luc. proj. obj. stage.
„ 3. Flagellated chambers, opening with wide month into exhalent canal. H. VII. C. l. proj. obj. stage.

Figs. 4—6. Cribrochalina sluiteri. Vosm. (N°. 43).

Fig. 4. Longitudinal section through the top of the funnel. H. II.
„ 5. Id. a little lower. H. II.
„ 6. Subdermal cavities (?) and skeleton of the outside of the funnel. H. II.

Figs. 7—8. Phakellia bowerbanki. n. sp. (N°. 72).

Fig. 7. External surface of one side. Magn. pocket-lense.
„ 8. Id. of the other side. id.

Figs. 9—10. Acanthella multiformis. n. sp. (N°. 88).

Fig. 9, 10. *tr. ac.* H. IV.

Figs. 11—14. Artemisina suberitoides. n. g.; n. sp. (N°. 14).

Fig. 11. Part of connective tissue with embryo in a hole. H. IV.

Fig 12. Section at right angles to the surface of the Sponge. P. papillae. *c.* canals *e.* embryoes. Slightly magnified.
„ 13. Longitudinal section. *s.d.c.* subdermal cavities.
„ 14. Section through embryo lying in mesodermic capsule on the right some flagellated chambers and canals. H. VII.

Figs. 15—16. Myxilla barentsi. n. sp. (N°. 19).

Fig. 15. Specimen covering a Pecten-shell; section at right angles to the surface. *s.d.c.* subdermal cavities.
„ 16. Surface with oscules. Magn. pocket-lens.

Fig. 17. Gellius vagabundus. (O. S.) Vosm. Nat. size; partly cut in two directions in order to show the wide canals.

Figs. 18—19. Gellius arcoferus. n. sp. (N°. 83).

Fig. 18. Vertical section through the wall. Nat. size.
„ 19. One side of the surface.

Fig. 20. Gellius infundibuliformis. n. sp. Vertical section through the middle of the Sponge. Nat. size (N°. 37).

Figs. 21—22. Esperia lingua. (Bwk.) Vosm. (N°. 34).

Fig. 21. Vertical section. Nat. size.
„ 22. View of the surface with incurrent sieves. Magn. pocket-lens.

Figs. 23—24. Melonanchora elliptica. Crtr. Oscular apparatus. In fig. 23 nat. size, in fig. 24 × 3.

Figs. 25—29. Polymastia capitata. Vosm. (N°. 28).

Fig. 25. *tr°.* (*tr°.*) H. VII.
„ 26. *tr°. ac.* H. IV.
„ 27. (*tr°*) *ac.* H. IV.
„ 28. *tr°. ac.* H. VII.
„ 29. *tr°. ac.* H. IV.

Figs. 30—32. Stelletta fortis. n. sp. (N°. 91).

Fig. 33. Suberites spec. (N°. 66) *tr°. ac.* head.

Figs. 34—37. Gellius infundibuliformis. n. sp. (N°. 37).

Figs. 34—36. Heads of *tr°. ac.* en (*tr°*) *ac.* H. VII.
Fig. 37. ∾. H. VII.

PLATE V.

Fig. 1. Craniella mülleri. Vosm. (N°. 12). Head of *M. ta.* $\varphi < 90°$. — H. VII.
„ **2.** The same. Head of *M. ta.* $\varphi > 90°$. H. VII.
„ **3.** Tetilla polyura. O. S. (N°. 17). Head of *M. ta.* $\varphi > 90°$. H. VII.

Fig. 4. The same. Head of *M. ta.* $\varphi > 90°$. H. VII.

„ 5. The same. Id. id.

„ 6. The same. Extremities of *ac. ac.* H. IV. *ab.* = $^2/_5$ of the total length.

„ 7. The same. Head and end of the shaft of *M. ta.* $\varphi < 90°$. H. VII. Total lenght about 0.8 c.m.

„ 8. **Polymastia hemisphaerica.** (SARS) VOSM. Head of (*tr°*). *ac.* H. VII.

„ 9. The same. Head of *tr°. ac.* H. VII.

„ 10. The same. Head of short *tr°. ac. f.* H. VII.

„ 11—16. The same. H. IV.

„ 17. **Inflatella** (?) (N°. 51) ac^2. (*f*). H. IV.

„ 18. The same. *tr°. tr.* (*f*). H. IV.

„ 19. The same. Head of *tr°. tr.* (*f*). H. VII.

„ 20. **Reniera ?** (N°. 67) ac^2. H. VII. (Not mentioned in the text, being only a small fragment.)

„ 21—23. **Quasillina brevis.** (BWK.) NORM. (N°. 79). H. VII.

„ 24. The same. H. IV.

„ 25. **Phakellia arctica.** n. sp. (N°. 86) *tr. ac.* H. VII.

„ 26. The same. ac^2. H. VII.

„ 27. The same. Head of tr^2. H. VII.

„ 28—31. **Gellius vagabundus.** (O. S.) VOSM. (N°. 77). H. VII.

„ 32, 33. The same. (N°. 76). H. VII.

„ 34, 35. **Chalina.** spec. (N°. 75). H. VII.

„ 36—38. **Gellius vagabundus.** (O. S.) VOSM. (N°. 74). H. VII.

„ 39. **Phakellia bowerbanki.** n. sp. (N°. 72). H. VII.

„ 40, 41. **Weberella bursa.** (MÜLL.) VOSM. (N°. 9). H. VII.

„ 42—44. The same. H. IV.

„ 45—47. **Phakellia bowerbanki.** n. sp. (N°. 40). H. VII.

„ 48, 49. **Stellata fortis.** n. sp. (N°. 91). H. VIII.

„ 50. **Alebion piceum.** VOSM. (N°. 49). H. VII.

„ 51—54. **Artemisina suberitoides.** VOSM. (N°. 14). H. VII.

„ 55. The same. (*tr°*). *ac.* H. IV.

„ 56—59. **Myxilla barentsi.** n. sp. (N°. 19). H. VII.

„ 60—66. **Forcipina bulbosa.** (CRTR.) VOSM. (N°. 20). H. VII.

„ 67. The same. ZEISS D.

„ 68. The same. H. VII.

„ 69, 70. **Melonanchora elliptica.** CRTR. (N°. 32). H. VII.

Fig. 71. The same. H. IV.

„ **72.** The same. H. VII.

„ **73.** **Esperia lingua.** (Bwk.) Vosm. (N°. 34). H. IV.

„ **74—77.** The same. H. VII.

„ **78—81.** **Desmacidon ?** (N°. 45). H. VII.

„ **82—86.** **Hamacantha papillata.** n. sp. (N°. 89). H. VII.

„ **87.** **Gellius arcoferus.** n. sp. (N°. 83). H. IV.

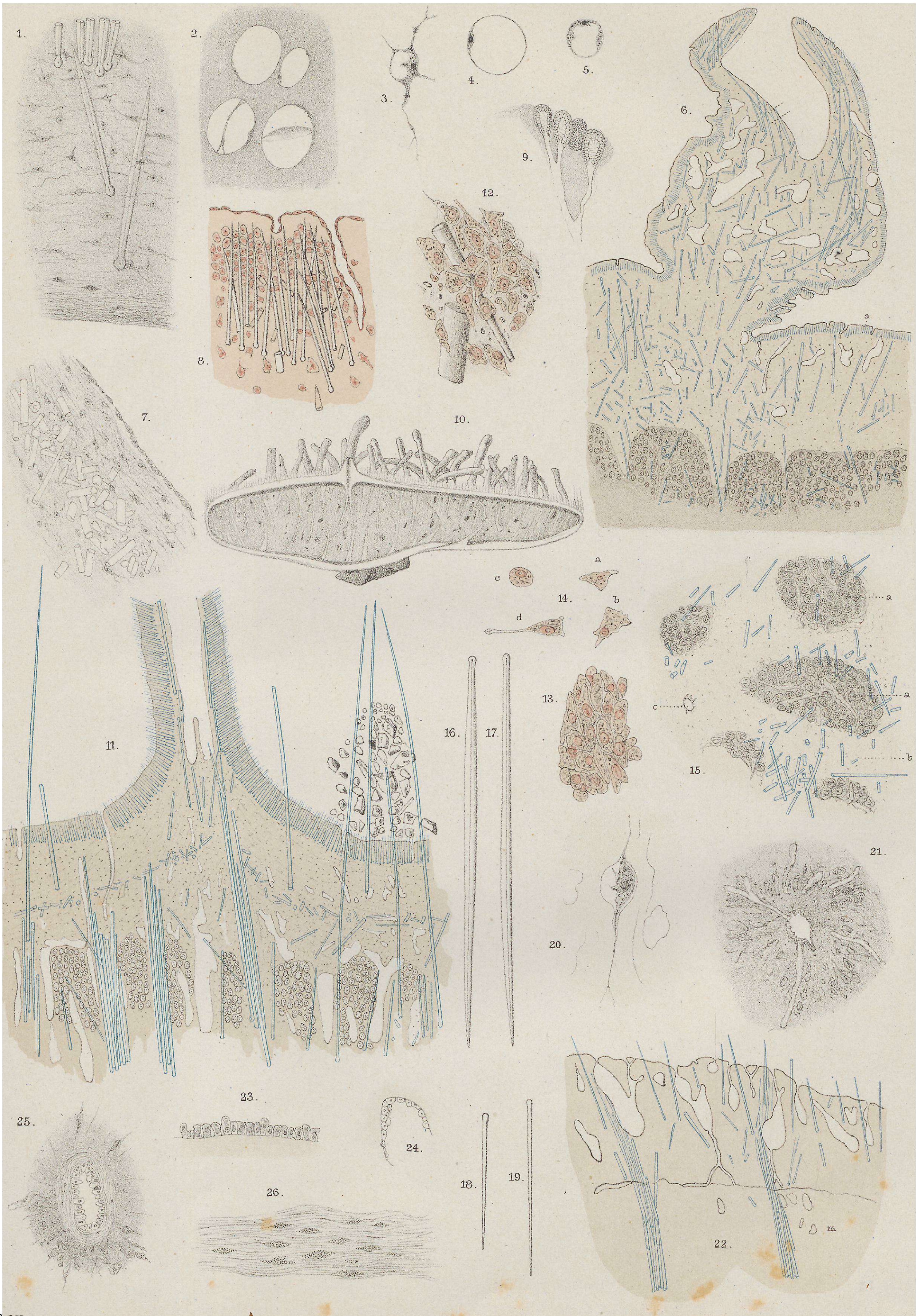
„ **88—90.** The same. H. VII.

G.C.J. Vosmaer fec.

P.W.M. Trap impr.

A.J. Wendel lith.

G. C. J. Vosmaer fec. P. W. M. Trap impr. A. J. Wendel lith.



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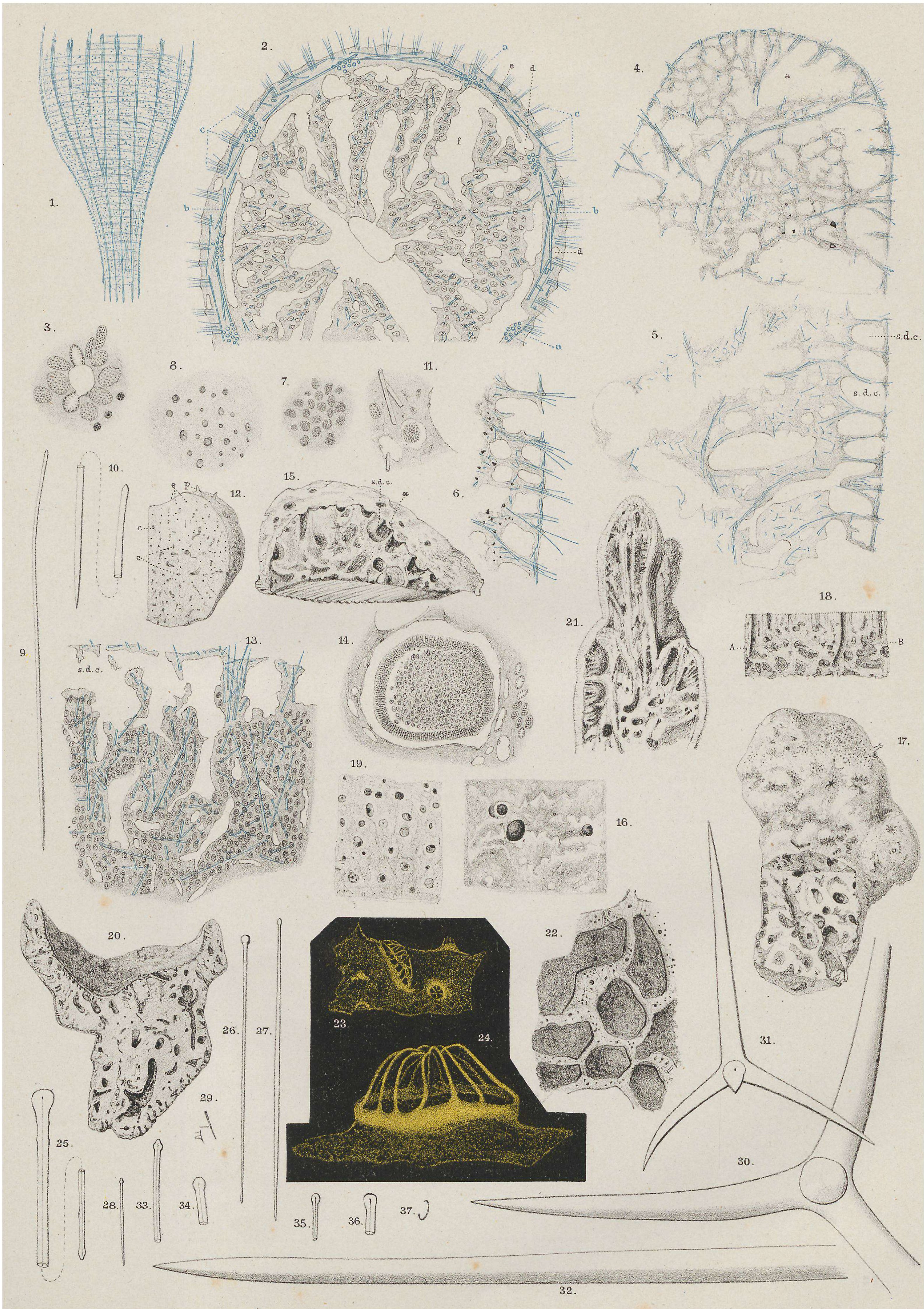

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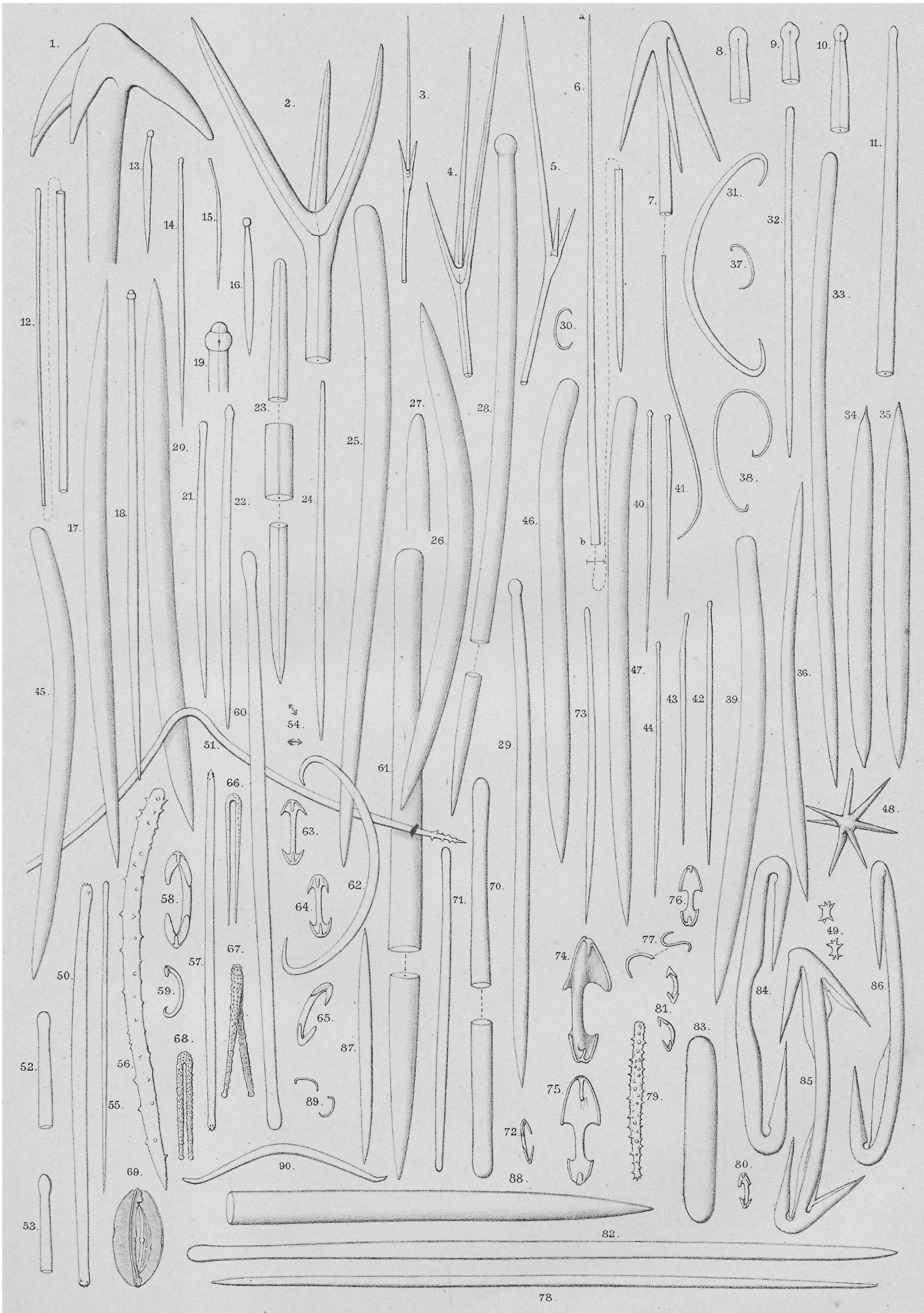
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